MARCH 16, 1946

Railway Age

Founded in 1856

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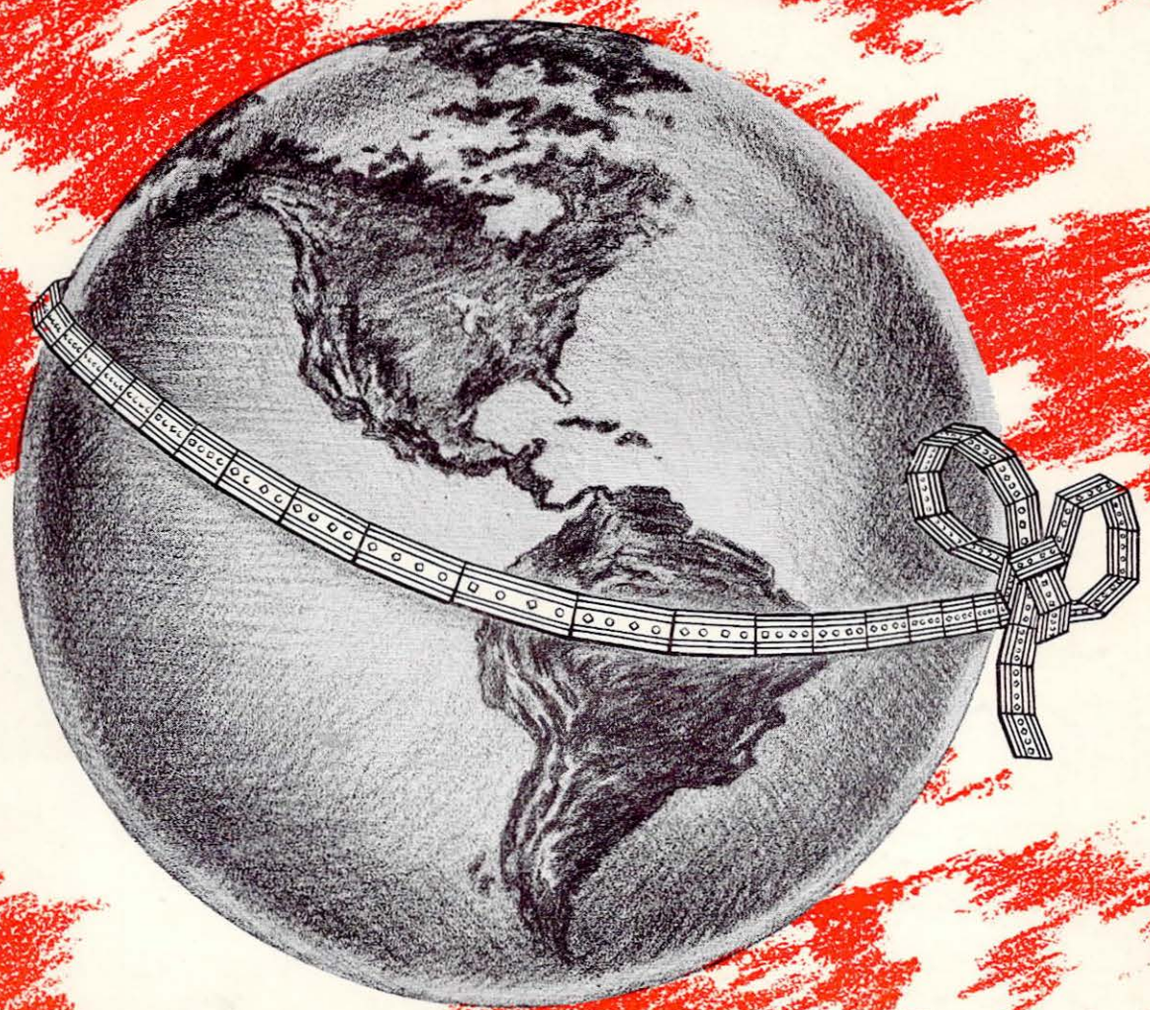
32 MILLION

HEADFREE JOINTS Purchased by Railroads in the United States and Canada Since Their Introduction...



More Than Enough Bars Laid End to End to Circle the World at the Equator

The Rail Joint Company

New York

PORTER—DIESEL-ELECTRIC Switchers

and now—

FINGER-TIP CONTROL

- *POSITIVE*
- *ACCURATE*
- *INSTANTANEOUS*

This is the PORTER Finger-Tip Control. The slightest movement of the throttle is hydraulically transmitted to the motor speed control.

To the progressive refinements constantly being incorporated in PORTER Diesel-Electric Switchers we now add FINGER-TIP CONTROL.

Utilizing the hydraulic principle of transmitting motion, PORTER'S Finger-Tip Control assures accurate synchronization of motors, and positive, instantaneous response to the slightest movement of the throttle lever in the cab. Finger-Tip Control eliminates troublesome rods, cables, pulleys, and turnbuckles, with their tendency to lost motion, back lash, and need for constant adjustment. Complete description and photographs on request.

LOCOMOTIVE DIVISION:
Diesel, Diesel-Electric, Steam, and Fireless Steam Locomotives

MT. VERNON CAR DIVISION:
Freight Cars of Every Type

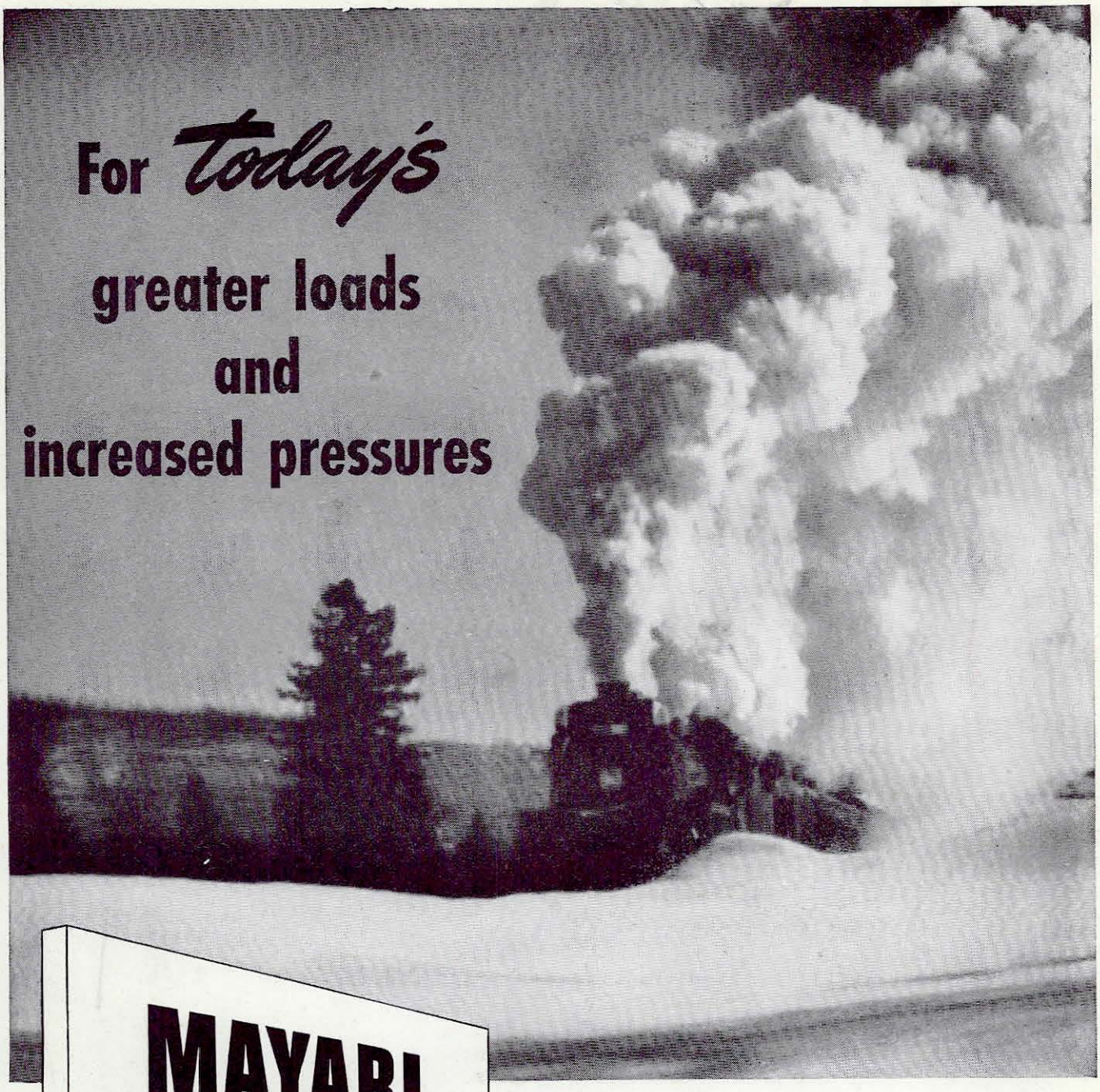
SPRING DIVISION:
Coil and Elliptic Springs

Write today for your copy of "PORTER Diesel-Electric Locomotives," containing full description of modern Diesel-electric locomotive design.

PORTER "Better Built" Equipment
Established 1866

H. K. PORTER COMPANY, Inc.
PITTSBURGH, PENNSYLVANIA
District Offices in Principal Cities

Published weekly by Simmons-Boardman Publishing Corporation, 1309 Noble Street, Philadelphia, Pa. Entered as second class matter, January 4, 1933, at the Post Office at Philadelphia, Pa., under the act of March 3, 1879. Subscription price $6.00 for one year U. S. and Canada. Single copies, 25 cents each. Vol. 120, No. 11.



MAYARI
(RHYMES WITH "FIERY")
STAYBOLT STEELS

BETHLEHEM STEEL

These steels are consistently high in fatigue-resistance —always a critical factor in staybolts.

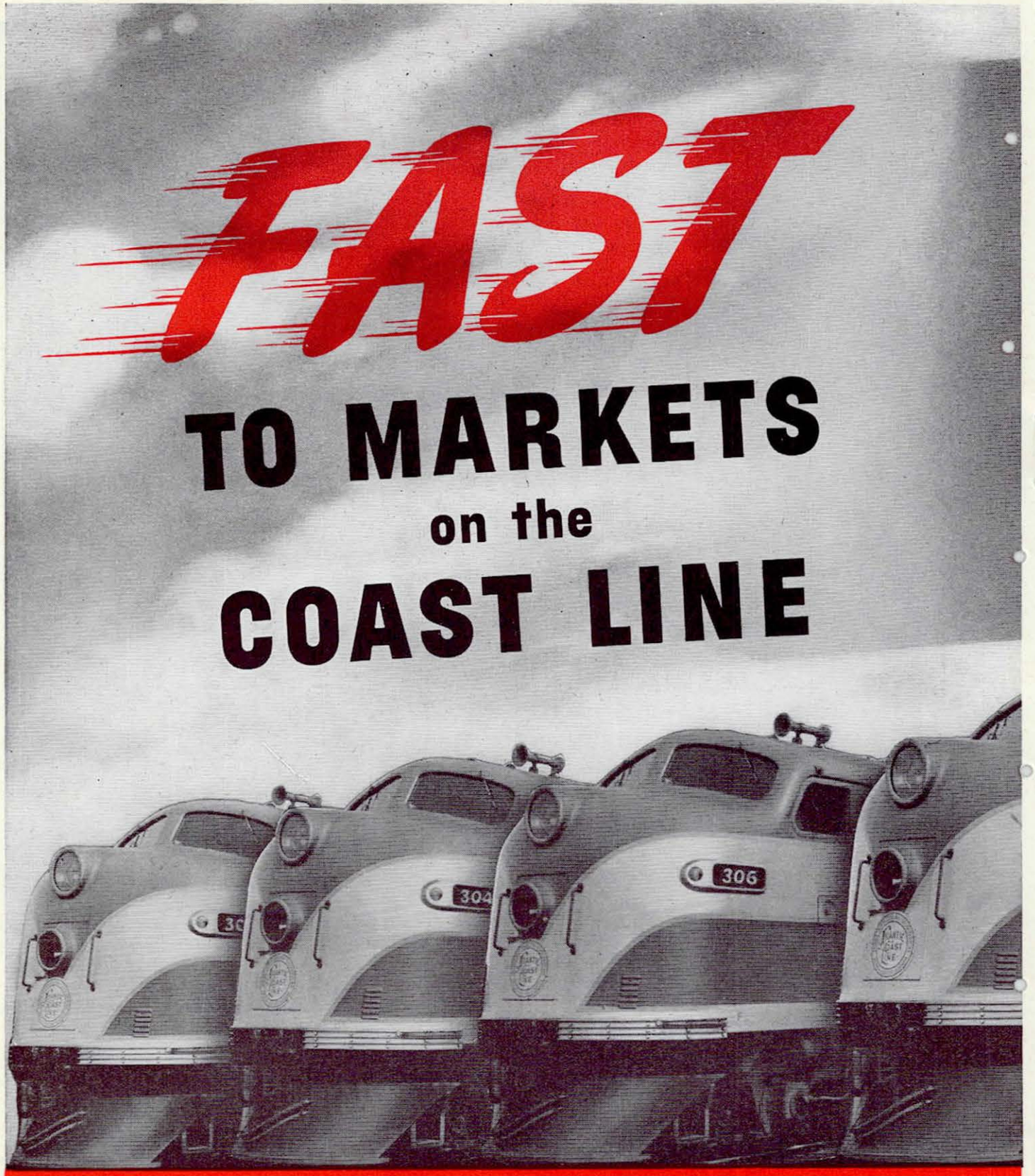
They have the strength required by increased boiler pressures. You may specify either 50,000 or 55,000 lbs. per sq. in. minimum tensile without loss of heading properties.

They have excellent ductility without sacrifice of other needed properties.

They are modern as today's date on the calendar . . . made to meet the new trends in locomotive design.

And even with these advantages—

Mayari costs you *less* than the ordinary, commonplace materials. Specify Mayari staybolt steels—and save with safety!



SINCLAIR

Efficient movement of vast freight traffic through America's east coast empire calls for a tremendous job of railroading. That's a job handled with comparative ease by Coast Line's fleet of Diesel giants.

Whether it be long hauls of heavy industry's products—or the race to northern markets with Florida's citrus crops—Diesels deliver. Diesel power and speed plus Coast Line's high operating efficiency and notable maintenance assure fast runs to destinations.

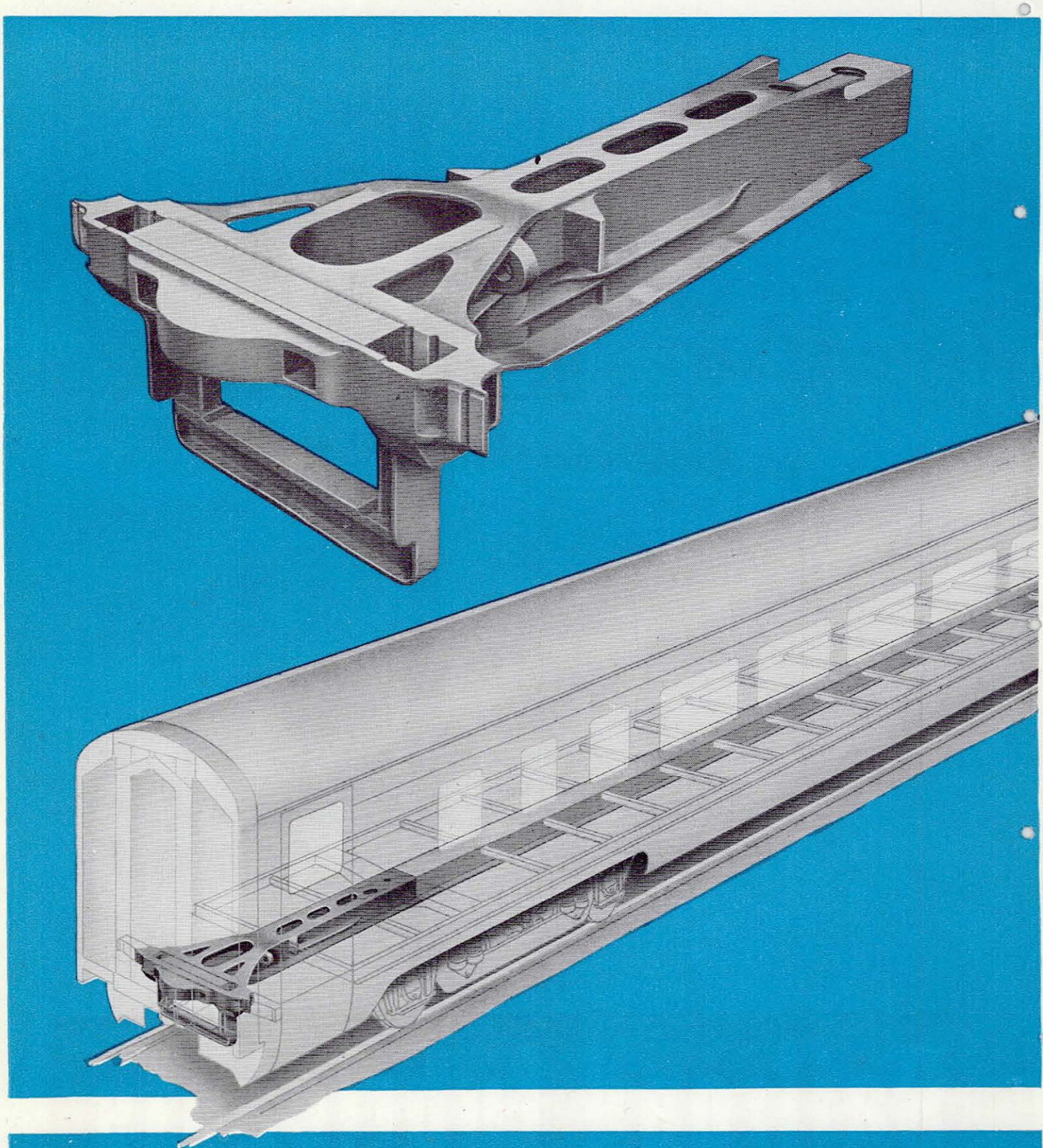
High speeds and heavy duty service demand top lubricating efficiency. Coast Line uses SINCLAIR GASCON Diesel lubricating oil in its freight titans.

GASCON OIL is noted for solvent action promoting clean engine operation . . . for wear-prevention qualities which keep costs of parts replacement very low. GASCON'S lubricating performance is proved by its use on 35 railroads . . . by its service record in the locomotives of crack streamliners, as well as huge freight Diesels.

Railroad Lubricants

SINCLAIR REFINING COMPANY, *RAILWAY SALES*, NEW YORK · CHICAGO · ST. LOUIS · HOUSTON

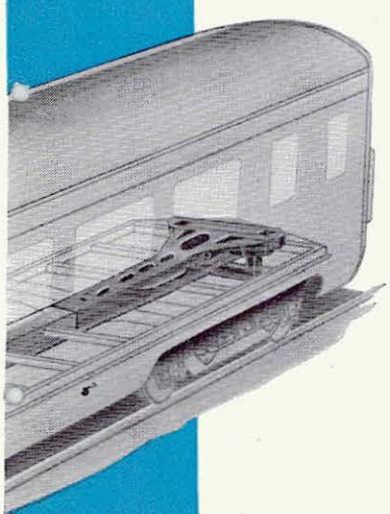
Your New Passenger



GENERAL STEEL

Cars Will Be Better-Built, Stronger, Safer

with COMMONWEALTH One-Piece Platform Center Sill Castings



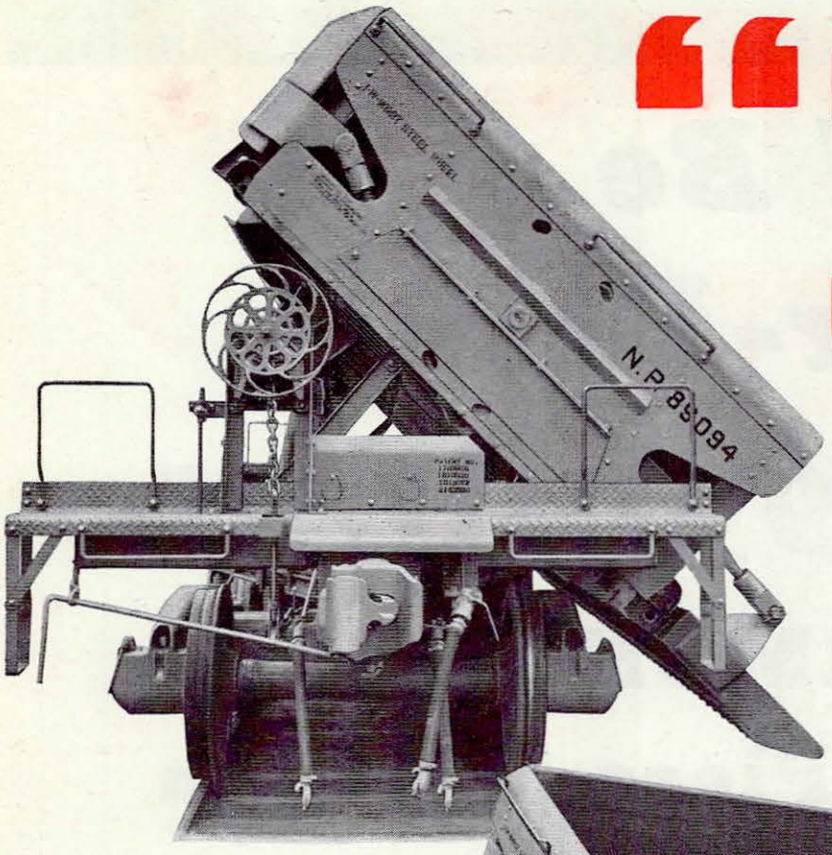
THE introduction of high-speed, modern, light weight passenger trains has necessitated important changes in the construction of passenger cars, both in design and materials, to insure adequate strength with less weight.

The COMMONWEALTH one-piece cast steel Platform Center Sill Casting, incorporated at each end of the car underframe, and connected to the center sill, as illustrated, provides the simplest, strongest, and best construction, minimizing damage to cars in collision. It meets all required safety standards and achieves ***great strength without an increase in weight.***

COMMONWEALTH One-Piece Cast Steel Underframe End Castings are also provided with the body bolster cast integral and, if desired, can be arranged for Buffing Device.

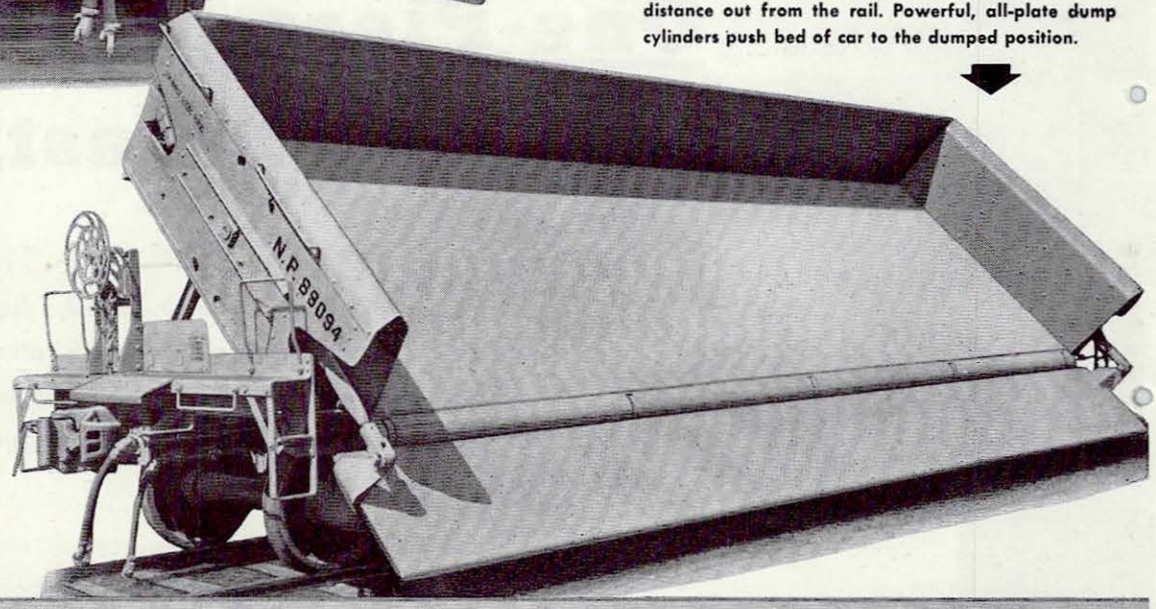
CASTINGS EDDYSTONE, PA. GRANITE CITY, ILL.

"30" for the

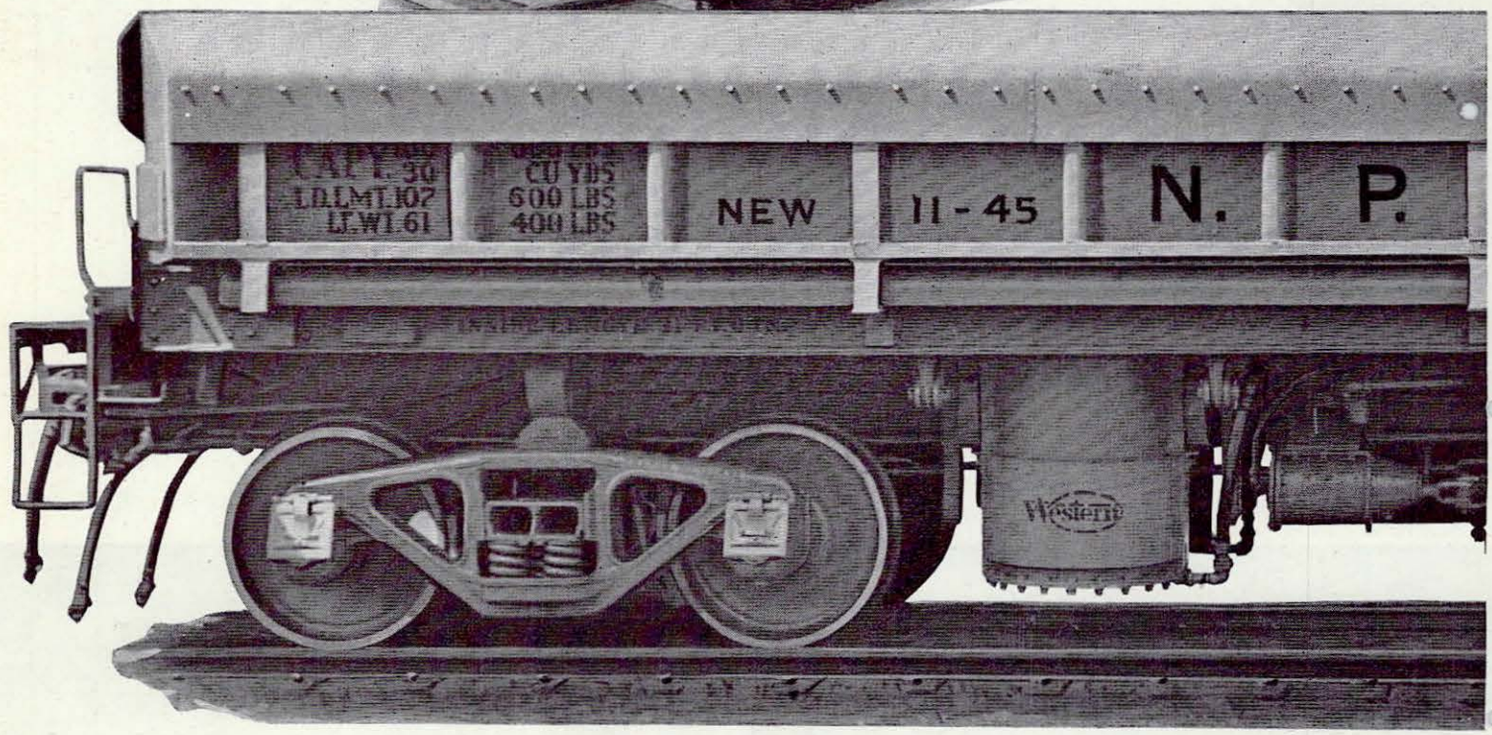


Drop door in dumped position protects track and ballast from backfill. Floating door mechanism prevents damage to door, door mechanism and body should an obstruction along the track be struck during dumping operation.

Steep dumping angle of 50 degrees provides unlimited clearance for the unloading of the largest chunks of material, which are deposited in the clear a maximum distance out from the rail. Powerful, all-plate dump cylinders push bed of car to the dumped position.



30 cu. yd. level-full, 100,000 lb. capacity, standard, heavy-duty, railroad-type, dual side pivot, drop door, all steel, automatic air dump car. Car bed rests on underframe, upon rubber shock-absorbing cushion pads. Doors are designed for exceptional strength at top.



NORTHERN PACIFIC"

Thirty of the cars shown on these pages have been delivered to the Northern Pacific Railway . . . one more among the great railroad systems of the world that have selected "Western" after thorough investigation of all makes of Dump Cars.

"Western" Dump Cars incorporate the features in design and construction necessary to railroad operation. Cars, individually or in combination, can be quickly and easily dumped while standing still or moving slowly ahead. Low center of gravity and complete stability in running and dumping are built into every "Western" car. Careful adherence to I.C.C. and A.A.R. Regulations insure their universal acceptance for interchange service under load. Strength has been increased and dead weight kept to a minimum by the use of high tensile alloys. The best of materials are utilized with the skill born of 70 years of research and experience. For reasons such as these more than 100 railroads are using "Western" Dump Cars.

Recent purchasers are shown in the following list:

CHICAGO, MILWAUKEE, ST. PAUL AND PACIFIC R. R.
COLORADO & WYOMING RAILWAY COMPANY
MAINE CENTRAL RAILROAD
NORFOLK & WESTERN RAILWAY
SPOKANE, PORTLAND AND SEATTLE RAILWAY SYSTEM
CHICAGO, BURLINGTON & QUINCY RAILROAD
ATLANTIC COAST LINE
THE ALASKA RAILROAD

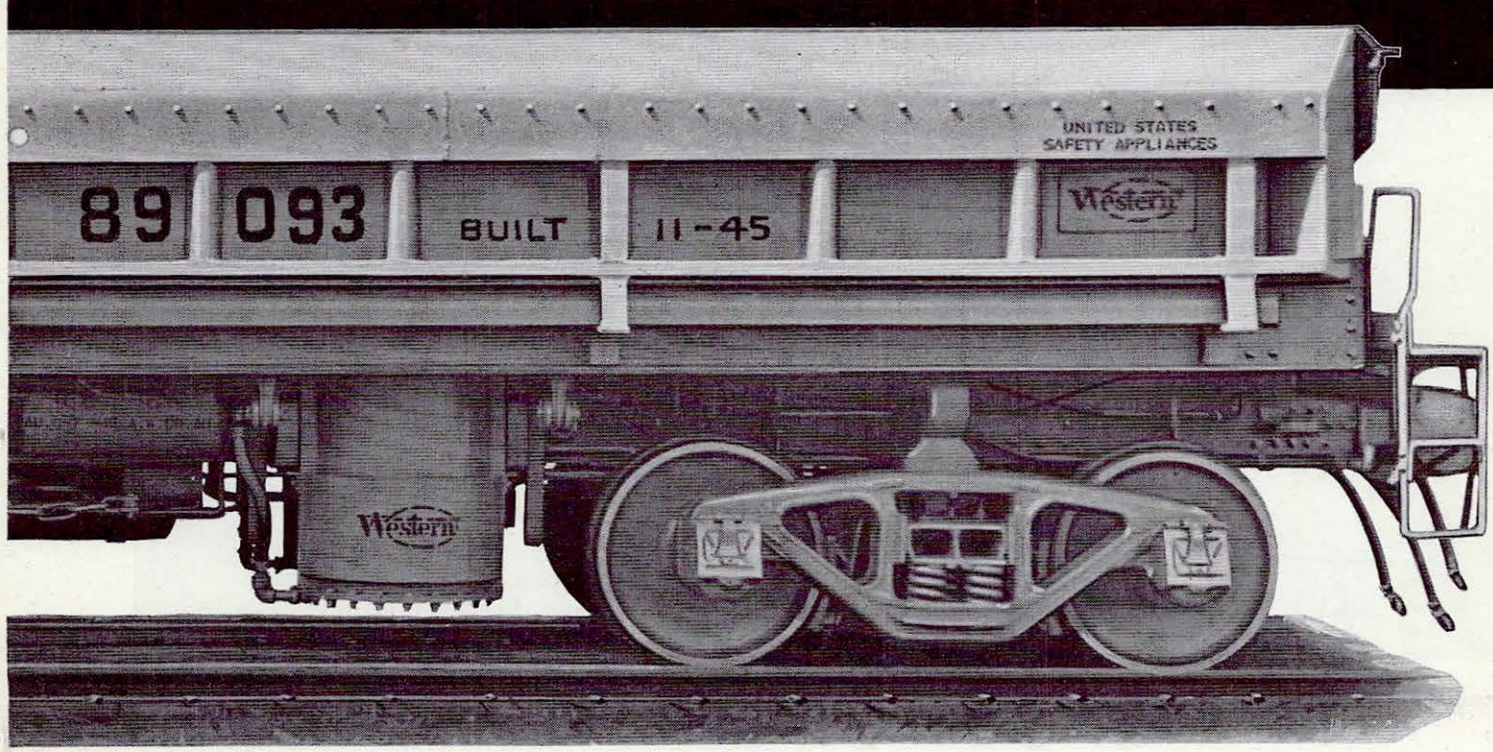
World's Largest Manufacturer Western of Dump and Trail-Cars

AUSTIN-WESTERN COMPANY

(Formerly the Western Wheeled Scraper Company)

AURORA, ILLINOIS • CABLE ADDRESS: AWCO, AURORA

Austin-Western also builds Power Graders, Rollers, Shovels and Cranes, Street Sweepers and a complete line of Rock Crushing and Screening Plants and kindred equipment.



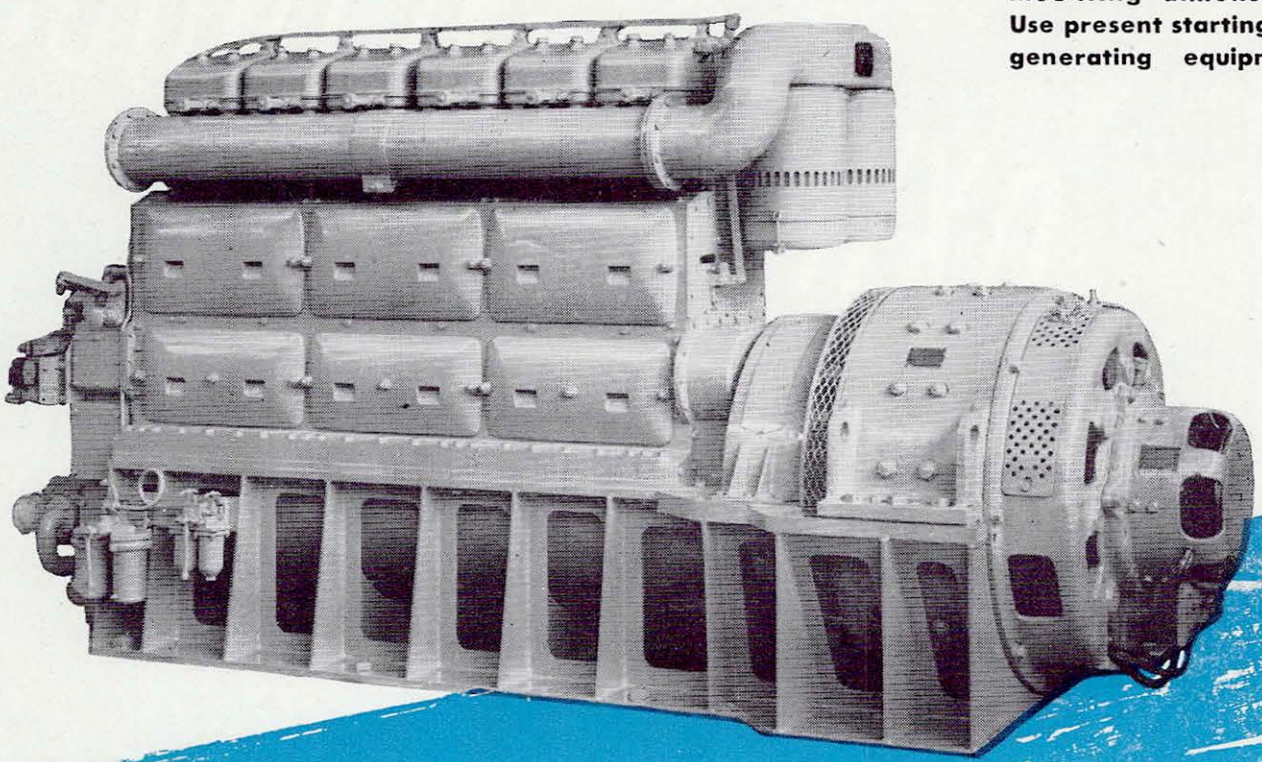
FOR EFFICIENT ECONOMICAL RAIL CAR OPERATION . . .

Convert to *Hamilton DIESELS

Pennsylvania rail car powered by Hamilton Diesels, one of six installations.

Rock Island rail car with single installation. Four others have dual Hamilton Diesels.

No change in sub-base mounting dimensions! Use present starting and generating equipment!

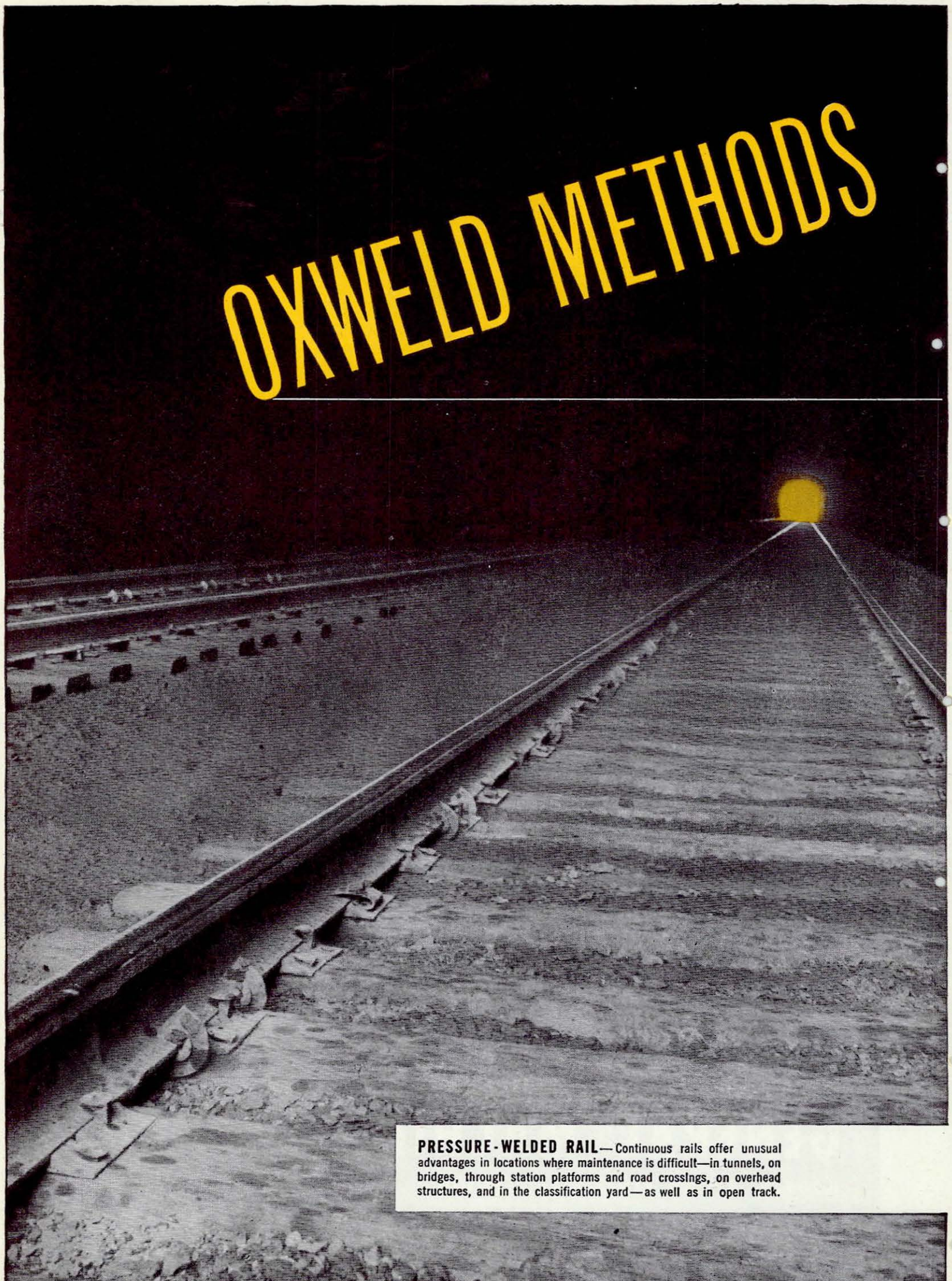


RECORDS for fuel-economy and low maintenance are invariably set when rail cars are converted to super-efficient Hamilton Diesel power. Typical are the several installations in Pennsylvania and Rock Island cars, consisting of both single and dual 400 h. p., single-action, four cycle, six cylinder engines. During many busy years these Hamilton Diesels have established themselves as ideal for this type of service.

GENERAL MACHINERY CORP.

HOOVEN, OWENS, RENTSCHLER DIVISION — HAMILTON, OHIO

OXWELD METHODS

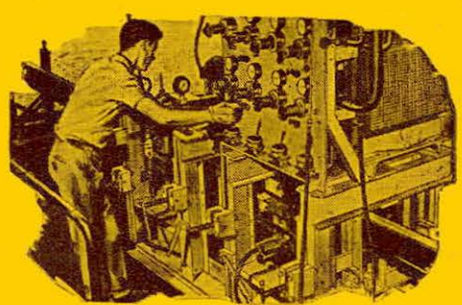


PRESSURE-WELDED RAIL—Continuous rails offer unusual advantages in locations where maintenance is difficult—in tunnels, on bridges, through station platforms and road crossings, on overhead structures, and in the classification yard—as well as in open track.

make track last longer

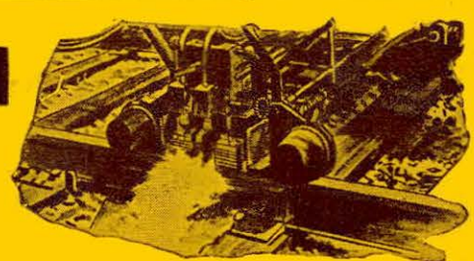
PRESSURE-WELDED RAIL

eliminates end batter and the need for joint maintenance



FLAME-HARDENED RAIL ENDS

resist batter and help prolong rail life



FLAME-STRAIGHTENED JOINT BARS

reduce the effects of rail end batter

BUILT-UP RAIL ENDS

increases the life of rail in first position from 50 to 100 per cent

OXWELD RAILROAD SERVICE

THE OXWELD RAILROAD SERVICE COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

Carbide and Carbon Building Chicago and New York

SINCE 1912—THE COMPLETE OXY-ACETYLENE SERVICE FOR AMERICAN RAILROADS

Listen to the High Iron Talking...

The high iron has a voice all its own.

Out there, where the loads are heavy and the speeds are high, it speaks with authority. It doesn't ask—it *demands*...

Lightness, with strength. Speed, with weight kept down close to the rails. Corrosion resistance to cut painting, reduce shoppings. Modern beauty, too.

On the facing page Alcoa shows how well aluminum can answer some of these demands. Its Imagineering possibilities, its freight and passenger uses, its utility value in buildings and equipment have earned an important place for Alcoa Aluminum in the rails' broadening program of public service. Consult our nearest sales office, or write Aluminum Company of America, 2178 Gulf Building, Pittsburgh 19, Pennsylvania.

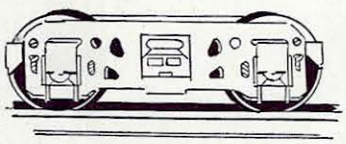
ALCOA FIRST IN ALUMINUM

REG. T. M.

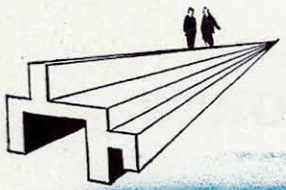
ALCOA ALUMINUM

METHODS AND MATERIALS FOR IMAGINEERING

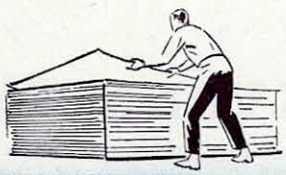
Large permanent mold and die castings of Alcoa Aluminum save machining, provide excellent finishes for such specialties as seat bases. Smaller castings cut cost and weight of baggage racks, window frames, light fixtures.



Truck side frames of Alcoa Aluminum forging? Imagineering can do it, eliminate much rail and roadbed punishment from unsprung weight.



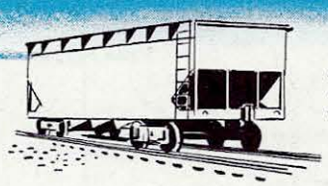
Imagineering produced this complex extruded shape for a passenger car sill as a single extrusion of Alcoa Aluminum, in 70 ft. lengths! Saves weight, assembly costs; adds strength.



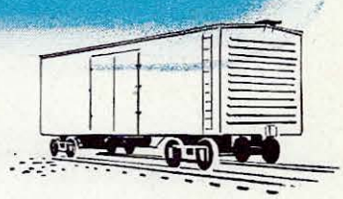
Easily formed Alcoa Aluminum sheet also challenges men who like to Imagineer. Available in a range of alloys and finishes to meet every job.

MORE PAYLOAD, LESS MAINTENANCE FOR FREIGHT

Hopper cars of Alcoa Aluminum end destructive corrosion from sulfur-bearing coal. Maintenance is cut way down.

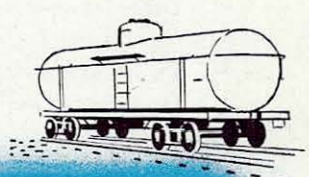


Aluminum refrigerator cars will ride lighter, with better balance, at passenger train speeds.

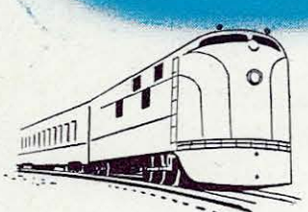


Strong, light boxcars of Alcoa Aluminum require less painting, infrequent shopping. Weight is down closer to rails, too.

Tank cars of Alcoa Aluminum handle corrosive liquids without damage to tanks or contamination of lading. Save weight.



LIGHT WEIGHT, STRENGTH AND BEAUTY FOR PASSENGERS



Passengers like Alcoa Aluminum equipment for its beauty—you'll like it for its light weight, strength, low maintenance.

Bars, chairs, tables and decorative paneling of Alcoa Aluminum brighten club cars, reduce dead weight.

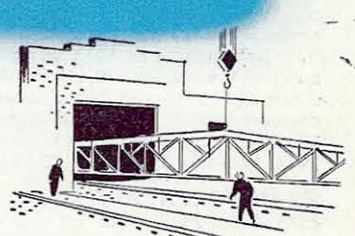
The modern day coach uses Alcoa Aluminum in seats, windows, paneling, lighting fixtures, baggage racks. It stays new.

Added roominess, comforts, and substantial weight reductions are possible in compartment and other sleeping cars using Alcoa Aluminum.

CORROSION RESISTANCE FOR RAILROAD STRUCTURES

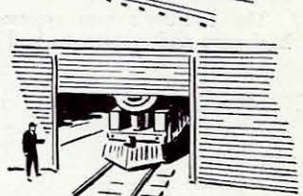
Outside and inside the station, Alcoa Aluminum brings enduring beauty to roofing, windows, doors, grills, handrails.

Alton & Southern replaces steel enginehouse roof trusses corroded in twelve years, with Alcoa Aluminum for lasting corrosion resistance.



Ramp and stair railings of Alcoa Aluminum are attractive and practical. Require little care to stay clean and new.

Norfolk & Western moved aluminum doors, installed in an old roundhouse in 1927, to newer building. Corrosion-resistant Alcoa Aluminum will provide many more years' service.



1846 1946

As it completes One Hundred Years of Transportation Progress...

PENNSYLVANIA RAILROAD REPORTS FOR THE YEAR 1945

INCOME STATEMENT

INCOME:		*Year 1945*	*Comparison with 1944*
Operating Revenues	Freight	$603,561,529	D $70,833,779
	Passenger	258,864,371	D 1,940,611
	Mail	14,821,654	D 21,015
	Express	10,836,165	D 1,327,154
	Other	48,369,692	I 560,058
		936,453,411	D 73,562,501
Other Income—chiefly dividends and interest on securities owned		*42,990,622	I 3,717,973
Total		979,444,033	D 69,844,528
EXPENSES:			
Operating Expenses		783,947,431	I 47,628,686
Taxes		54,340,013	D 98,498,395
Equipment and Joint Facility Rents		10,985,428	D 901,265
Rent for Leased Roads, Interest on Debt, etc.		81,162,923	D 2,361,361
Total		930,435,795	D 54,132,335
Net Income		49,008,238	D 15,712,193
DISPOSITION OF NET INCOME:			
Appropriations to Sinking and Other Funds, etc.		3,680,996	I 436,438
Retirement of Debt—Pennsylvania R.R. Co.		†	D 18,767,970
Dividend of 5% ($2.50 per share)		32,919,385	—
Balance of Income		12,407,857	I 2,619,339

*Includes dividend of $5,000,000 (par value) in securities received from Pennsylvania Company.

†$21,189,880 of debt was retired from current cash and other assets in 1945.

RESULTS FOR THE YEAR

The high level of business that prevailed during the war years continued during 1945, the volume being the third largest in the Company's history, and exceeded only in 1943 and 1944.

Costs of operation constantly increased due to higher costs of labor and higher costs of materials. Operating revenues of the Company declined $73,562,501, caused by the cessation of hostilities and labor disturbances in some of the larger industries. Expenses of operation increased $47,628,686, including $41,395,479 to cover the unamortized portion of the cost of emergency facilities required for the prosecution of the war. The Net Income in 1945 was $49,008,238 compared with $64,720,431 in 1944, a decrease of $15,712,193. Notwithstanding this decrease in Net Income, dividends paid in 1945 were maintained at the same rate paid in 1944, 1943 and 1942—5% ($2.50 per share).

TRANSPORTATION FOR THE FUTURE

The country's vast system of airways, highways and waterways will be expanded at the Government's expense, while all of the improvements for the railroads will be privately financed. The problems with which the railroads are faced as a result of the war should have intelligent consideration by state and national authorities wherever regulation restricts the opportunity for the rails to move forward.

The railroads want no subsidy; they want equity. They are a heavily taxed industry competing with subsidized industries, and all they ask is equality of opportunity.

As the railroads planned to meet the requirements of war, so they are planning for the opportunities of peace, and given a fair and equitable chance they will furnish the public the best in freight and passenger service.

TAXES

The Pennsylvania Railroad Company during the war years paid in taxes and disbursed for improvements and repairs, to meet the war load a sum of money equal to the entire debt upon the property. A national railroad system without any debt would place the railroads in the same position as their competitors, as the Government furnishes a large amount of the capital for the waterways, the highways and the airways.

There was much deferred maintenance during the war period. The Interstate Commerce Commission gave the railroads authority to create reserves to meet this situation. The taxation system, however, would not permit them to take any tax benefit on reserves so created, and money that should have been set aside for this purpose was taxed the same as other income. Deferred maintenance must, therefore, be paid out of post-war earnings, and the more the post-war earnings are siphoned off through taxation, the less will be the money the railroads can spend on rehabilitation and improvements.

Railway taxes, after adjustment by tax credits of $24,443,381 for prior war years, together with Unemployment Insurance taxes of $12,741,141, and Railroad Retirement taxes of $13,802,891, aggregated $54,340,013.

LEGISLATION

To clarify the intent of Congress with

respect to carriers subject to the Interstate Commerce Act, and to resolve any regulatory conflicts with the Antitrust laws, Congressman Bulwinkle of North Carolina introduced a bill, H. R. 2536, known as the Bulwinkle Bill, which gives such carriers protection from the Antitrust laws only to the extent that their acts and procedures have obtained prior Commission approval. The Bill was endorsed by the Interstate Commerce Commission and numerous state commissions, and by public and commercial bodies and by shippers and producers generally. It was passed by the House by a large majority and now awaits action by the Senate.

To insure consistent policies with respect to legislation, and the future efficiency of the transportation system, the Bill is worthy of the earnest support of the people, who have recently seen the vital importance to the nation of the ability of the carriers to work together in the public interest.

FREIGHT AND PASSENGER RATES

The railroads have done the war job with practically no increase in freight rates and a relatively small increase in passenger fares—2/10 of a cent per mile in basic coach fares and 3/10 of a cent per mile in fares good in Pullman cars.

The year 1946 will be one of greatly increased cost of operation and maintenance with a decreasing business, and it is therefore imperative to consider the need for increased railroad freight rates.

The railroads were granted a 5% increase in freight rates, in May, 1942, which however was suspended until six months after the war; but, as the situation appears to be developing, it will be necessary for the railroads to petition the Interstate Commerce Commission for an increase greater than that under suspension, in order to meet greatly increased expenses and avoid deficit operation.

Large expenditures must be made for the rehabilitation of the railroads. All of these necessities will require money in large amounts. Money requires credit, and the credit of the Company is very much affected by the rates at which the business is carried.

REDUCTION OF FUNDED DEBT

Maturities during the year amounted to $11,807,880, which together with other debt retired and canceled amounting to $9,382,000, made a total reduction of $21,189,880 in 1945. This reduction was offset, in part, by the issuance of $16,290,000 Equipment Trust Obligations.

In addition, as a result of refinancing of bonds and purchases from the public, other debt of System Companies was reduced $5,380,087.

The debt of the System in the hands of the public was, therefore, reduced $10,279,967 in 1945, making a net reduction of $148,670,000 during the last six years.

REFINANCING OF BONDS

The Company continued its policy of taking advantage of the prevailing money rates to refinance certain of its bonds, as well as those of its affiliated companies, and was able to make some very advantageous refundings, from which it will ultimately realize approximately $47,000,000 of savings.

EQUIPMENT

The ending of the war made it possible to acquire materials for construction of passenger cars, and there are under construction one hundred and twelve modern passenger train cars, of lightweight construction, of which ninety are being built in Altoona Shops, and twenty-two by an outside builder. They are the finest type ever to be built for the Company, and are especially designed for safety.

Since the close of the year, orders have been placed with outside builders for the construction of two hundred and fourteen passenger train cars of which one hundred and fifty-nine are to be sleepers, for the improvement of the post-war passenger service on the railroad.

Twenty-five of the largest and most modern steam freight locomotives and tenders were placed in service during the year. Orders were placed for fifty additional steam passenger locomotives and tenders and part of the order was delivered. One Diesel electric passenger locomotive was delivered during the year, and ten more were ordered.

On December 18, 1945, the District Court of the United States for the Eastern District of Pennsylvania approved the sale by Pullman Incorporated to a Buying Group of Railroads of all the outstanding stock of its wholly owned subsidiary, The Pullman Company, which owns and services the sleeping cars.

The Pennsylvania Railroad Company, as one of the railroads in the Buying Group, has purchased from The Pullman Company 142 lightweight sleeping cars assigned for service on its lines, as well as 123 regularly assigned parlor cars.

RESEARCH

The Company, always seeking through research in science and technology, through discovery and invention, to be in the forefront of progressive improvement in railroad travel and shipping, has continued to move forward during the year. Through its own research staff, through the research laboratories of the Association of American Railroads, and cooperatively with equipment manufacturers, the Company is alert in utilizing to the utmost improvements in the field of electronics, metallurgy, chemistry and engineering, which can be applied to increase the efficiency, comfort and safety of rail transportation.

EMPLOYES

As we come out of the war and enter the peace, it is a pleasure to acknowledge the efficiency and loyalty of the employes of the Pennsylvania Railroad and their devotion to duty.

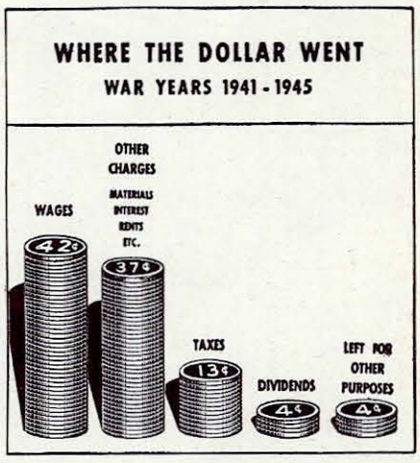
From the low ebb of the depression in 1938, with a depleted force, the Company moved into the heavy traffic of the war, met the peak load of its history, both passenger and freight, and is moving into the reconversion era. The Management wishes to acknowledge the splendid way the employes served their Country and the Company by meeting successfully every emergency they were called upon to face.

STOCKHOLDERS

The growth and expansion of the Company during the one hundred years of its existence is reflected in the number of shareholders, the shares outstanding and their distribution. When the Company was chartered there were 2,635 subscribers to the original issue of 60,257 shares of stock of the par value of $50 each, being an average holding of 22.87 shares by each subscriber.

On December 31, 1945, there were 214,995 holders of stock, and the number of shares outstanding had grown to 13,167,754. The average holding was 61.24 shares.

M. W. CLEMENT, *President.*



After providing for operating expenses, interest, rentals and other necessary charges, over half the remaining income went to taxes.

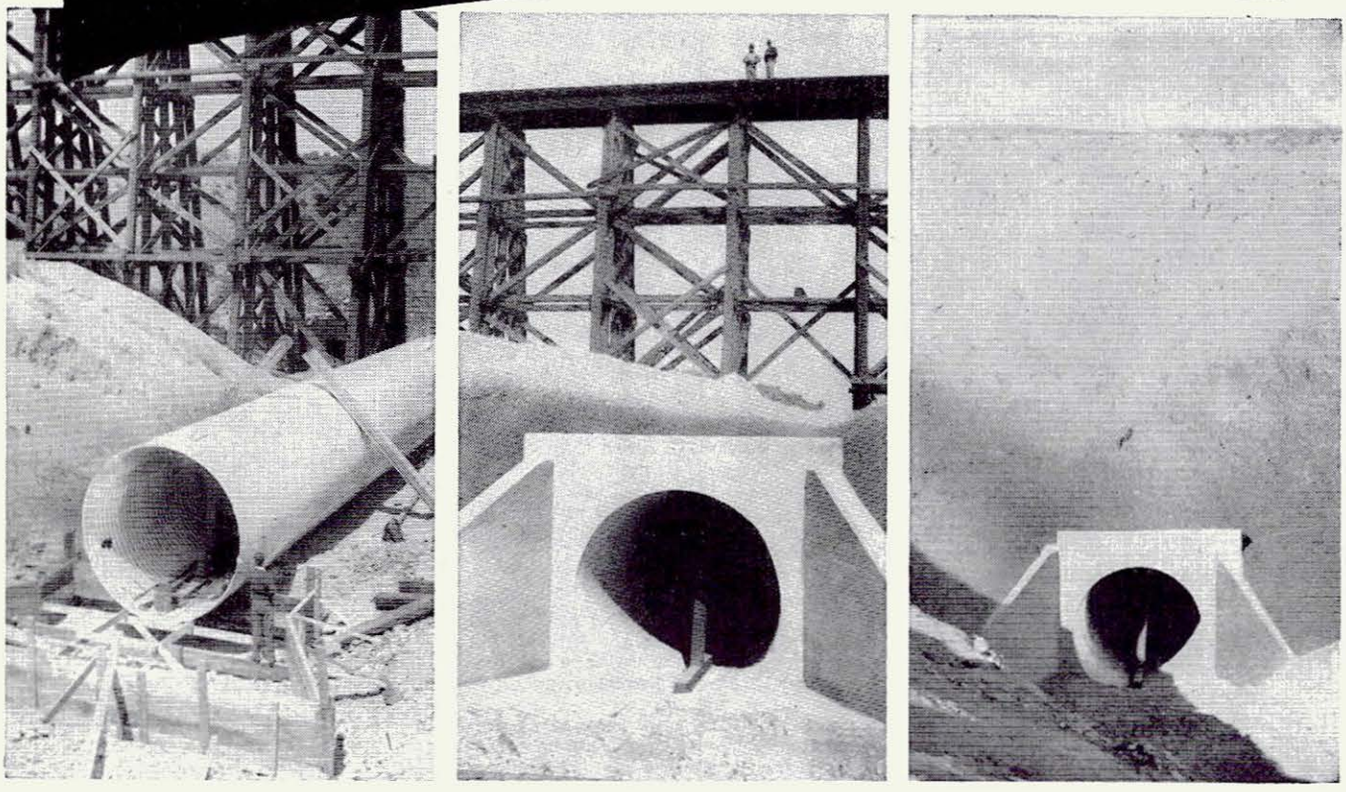
There has been a steady and substantial reduction of funded debt in the hands of the public, as this graph shows. Over the last six years the Pennsylvania Railroad System debt has been reduced $148,670,000.

PENNSYLVANIA RAILROAD

Serving the Nation

BUY UNITED STATES SAVINGS BONDS

This is the simple, practical answer *to excessive bridge repairs*



The maintenance superintendent of a main-line railroad rebuilds with ARMCO MULTI PLATE whenever a budget-eating trestle or bridge becomes unsafe.

It's easy to see why he relies on MULTI PLATE for new bridge jobs or replacements. Using these rugged structures, bridges can be "relined" or replaced without interrupting traffic. Unskilled men can assemble the curved plates quickly, bolt them together, and then backfill. Any kind of headwall design may be used with this adaptable material.

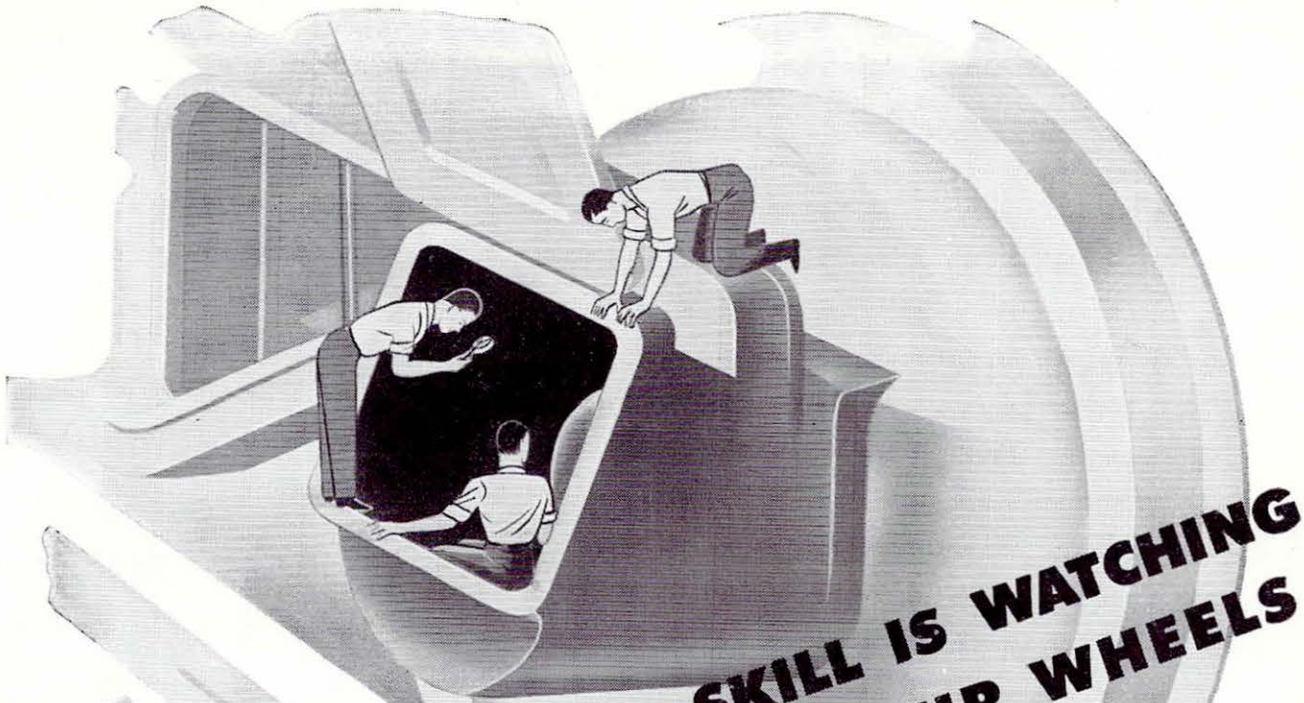
Learn how quickly you can repair or replace troublesome drainage structures with ARMCO MULTI PLATE. You'll be ahead on your modernization program if you plan now on using MULTI PLATE. Write to Armco Drainage & Metal Products, Inc., 1265 Curtis St., Middletown, Ohio.

Export: The Armco International Corporation

Armco Multi Plate

MULTI ARMCO PLATE

A PRODUCT ORIGINATED AND DEVELOPED BY ARMCO ENGINEERS



N·B·M ENGINEERING SKILL IS WATCHING OVER EVERY TURN OF YOUR WHEELS

Built into every N-B-M Journal Bearing and Engine Casting is our priceless engineering and research experience that means longer, more dependable service and insures against costly breakdown delays. Specify

N·B·M JOURNAL BEARINGS AND ENGINE CASTINGS

N·B·M

NATIONAL BEARING DIVISION

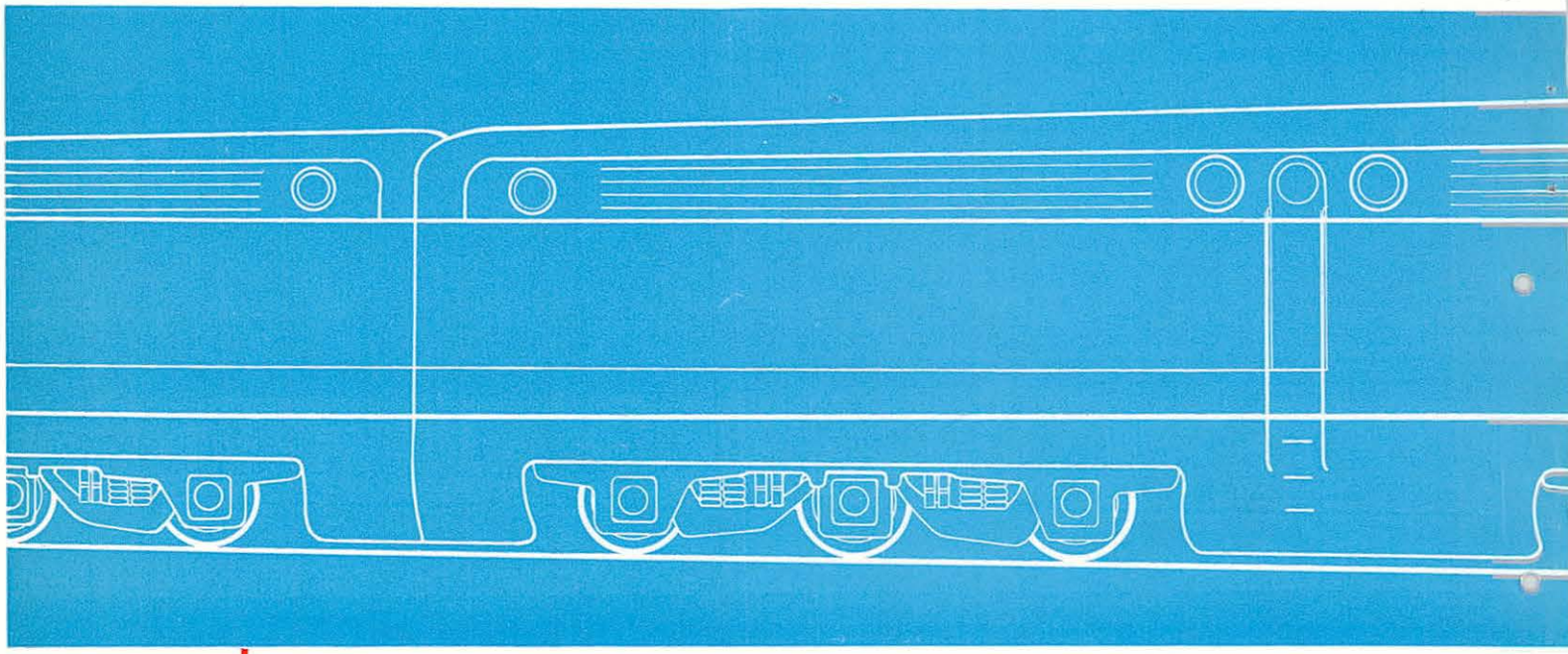
ST. LOUIS • NEW YORK

AMERICAN Brake Shoe COMPANY

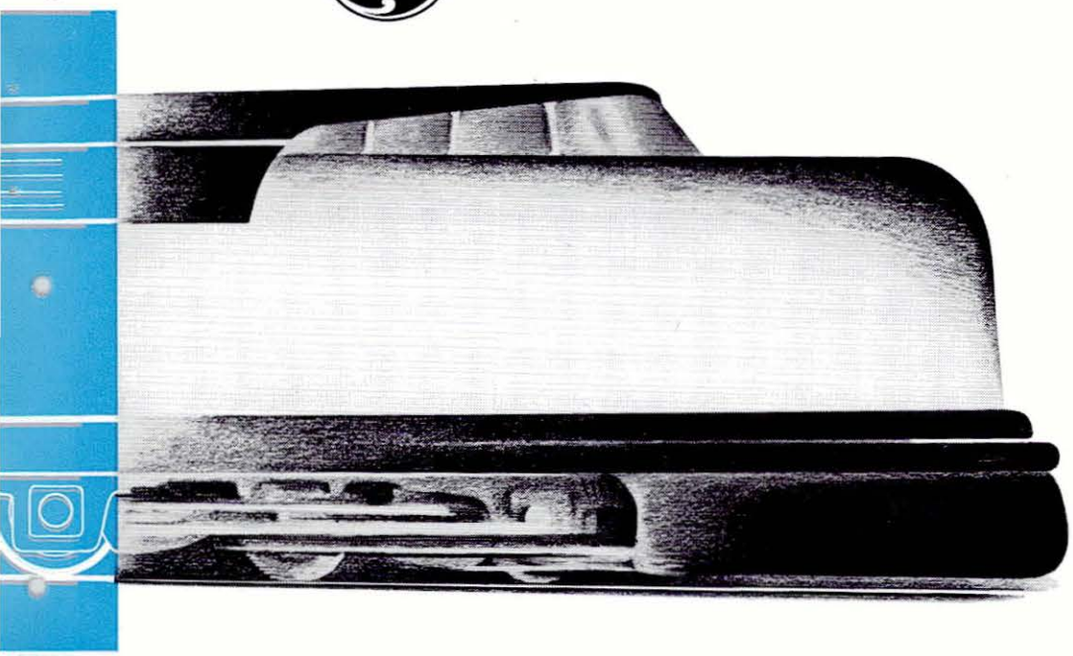
PLANTS IN: ST. LOUIS, MO. • PITTSBURGH, PA. • MEADVILLE, PA. • JERSEY CITY, N. J. • PORTSMOUTH, VA. • ST. PAUL, MINN. • CHICAGO, ILL.

COMING SOON...

a super diesel-electric from ALCO-G.E.



Alco GE



PLANNED by the cream of motive-power engineering talent . . .

STYLED by one of America's foremost industrial designers . . .

TESTED in laboratory and factory and on the road . . .

. . . A NEW, SUPER DIESEL-ELECTRIC WILL SOON ROLL OFF THE PRODUCTION LINES.

This mighty locomotive will bring you the combined benefits of our 20 years' experience building diesel-electrics for railroads, and our war time developments such as turbosuperchargers, power plant regulating systems, and high-efficiency diesel engines. It will produce—year after year—the high-speed, low-cost ton- and passenger-miles you'll need to successfully meet increased peace-time competition.

AMERICAN LOCOMOTIVE AND GENERAL ELECTRIC

113-159

The Scale Test Car that meets every requirement

ARA REQUIREMENTS

1. All-metal construction.
2. Two-axle construction, with wheelbase not to exceed 7 feet.
3. Load uniformly distributed on wheels.
4. No air-operated brakes (When operating rules of the owner road require,. they may be installed.)
5. Roller, or other form of anti-friction journal bearings.
6. No unnecessary equipment.
7. A minimum of ledges, cavities, or projections that will hold dirt, water, or other foreign matter.
8. Minimum surface area.
9. Smooth and sloped top to insure drainage.
10. Accessibility of all parts for inspection.
11. Ruggedness and durability in order to minimize repairs.

Lake Erie Railway Scale Test Cars not only meet every requirement of the ARA, but are built to the high standards of workmanship typical of all Lake Erie products. The finest materials and accessories are employed throughout.

Body—The body is a one piece semi-steel casting with the top sloped to prevent the accumulation of snow, ice or water.

Wheels—The wheels are rolled steel, 36" diameter, pressed onto the axles in regulation manner.

Axles—The axles are forged steel, ARA dimensions for 5½" x 10" journals.

Bearings—Timken roller bearings, enclosed in standard Timken boxes.

Brakes—Peacock hand brake and Westinghouse air brakes.

Springs—Springs are of the semi-elliptical type, one over each journal.

Draft Gear—Miner A22XB with pockets formed in the car body.

Couplers—Couplers are all-steel of Gould type.

All attachments . . . grab irons, steps, hand rails, and flag and lamp sprockets are installed in accordance with ICC requirements.

Scale Test Cars manufactured by Lake Erie are rugged, durable and accurate. They give years of trouble-free service. Among the many well-known railroads we serve are: the Erie, New Haven, Texas Pacific, Pittsburgh & Lake Erie, Central of Georgia, St. Louis & South Western, New York Central. Write Lake Erie about your Scale Test Car requirements.

LAKE ERIE
ENGINEERING CORP.
BUFFALO, N.Y. U.S.A.

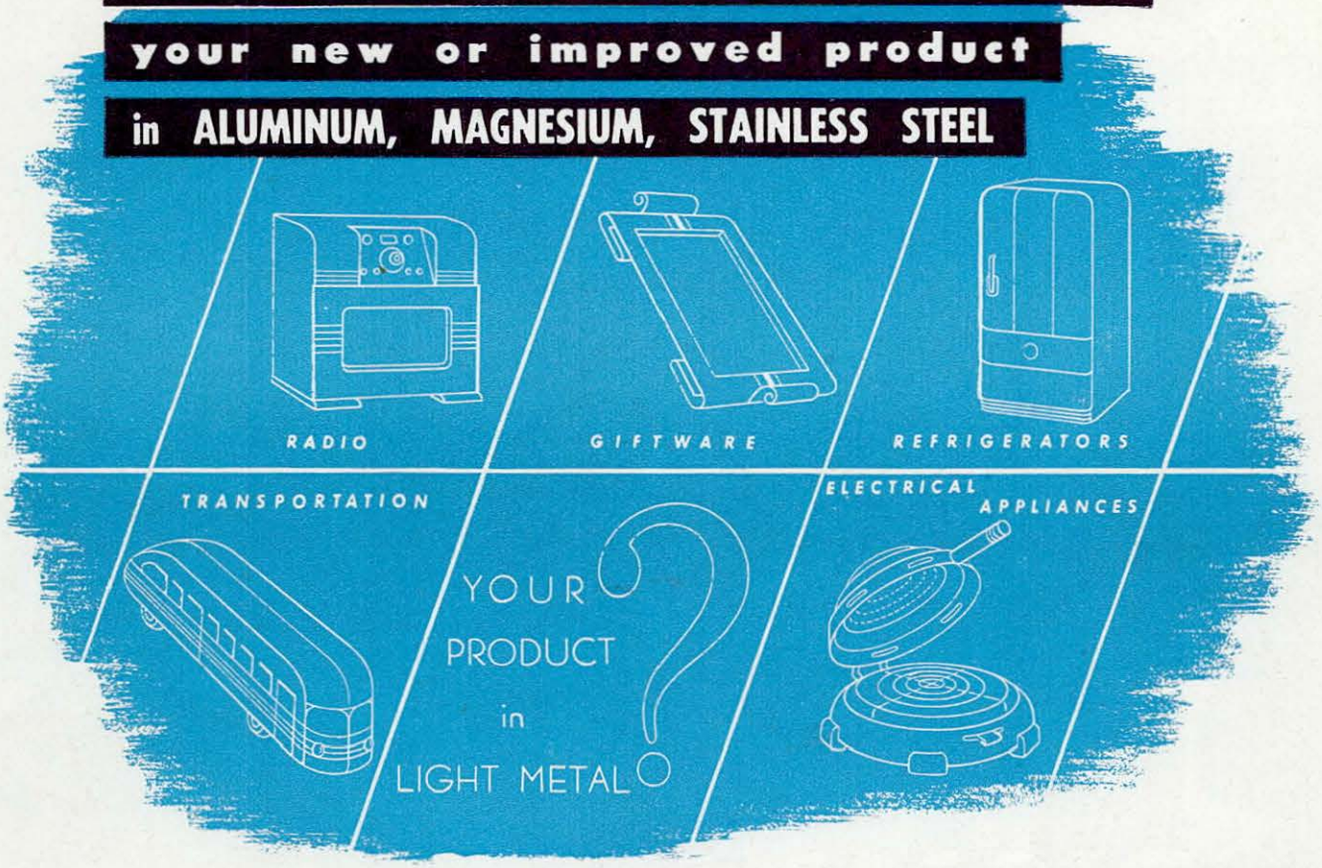
LAKE ERIE ENGINEERING CORP.
871 Woodward Ave., Buffalo 17, N.Y.

Offices in Principal Cities and Foreign Countries

Manufacturer of hydraulic presses for metal working..plastic molding..special purposes.

COLGATE

designs, fabricates, assembles your new or improved product in ALUMINUM, MAGNESIUM, STAINLESS STEEL



You name it, and let COLGATE work out a design with you. Then let us make it, partly or completely, fabricating and assembling your new or re-designed product from Aluminum, Magnesium, or Stainless Steel to give it these sales creating features—*lighter weight, added beauty, increased strength and durability, improved product performance, lower fabricating costs, reduced shipping weight.*

COLGATE'S "Engineered Service" provides helpful and cooperative preliminary conferences that save you time and expense before designs have been started, also after blueprints have been prepared. This unique COLGATE service helps develop your new product ideas, improves old products, explores the possibility of substituting light metals for other materials, and plans short-cuts for fast, economical production and the assembling of parts.

COLGATE'S complete and varied tooling and production facilities can be your "branch factory"—providing ample space, supplying the specialized skills and experience required for precision work, and making available straight-line mass production and assembly techniques in place of older, costlier methods. COLGATE can be depended upon to meet delivery dates!

Let COLGATE help get your product to market faster, better, more economically, and also solve your reconversion and production problems. Learn how "Engineered Service" can give your product the sales advantages of the light metals. Consult with COLGATE *now!* — no obligation, complete confidence assured.

STAMPING • FORMING • DRAWING • WELDING • FINISHING • ASSEMBLING

COLGATE *Aircraft Corporation*

AMITYVILLE, LONG ISLAND . . . NEW YORK

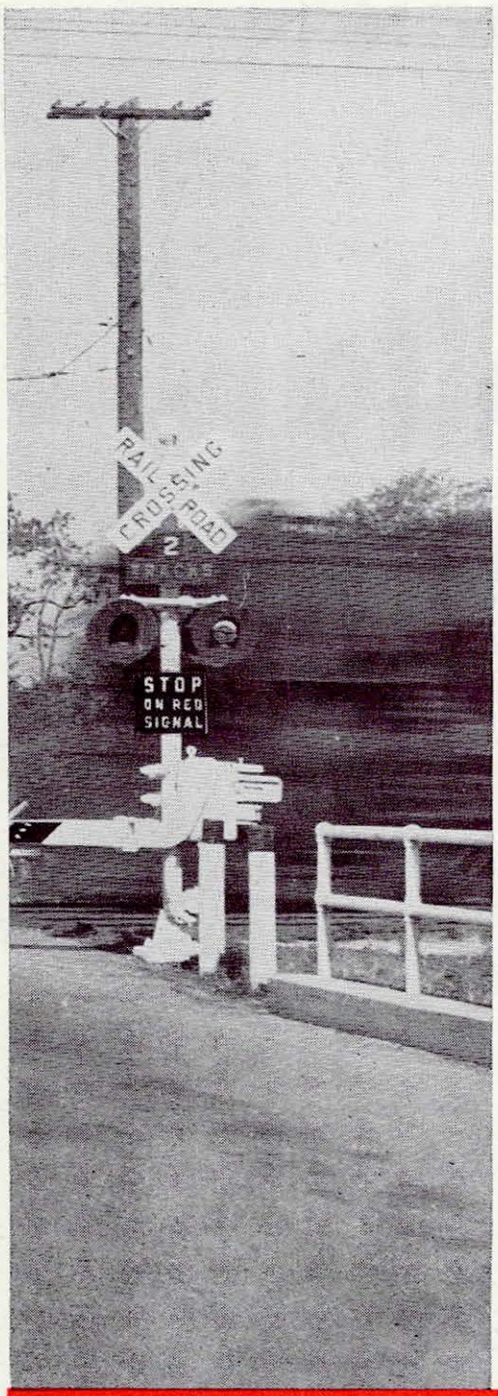
LIGHT METAL PRODUCTS DIVISION

ARMED FOR —

WESTERN RAILROAD

2406-2436 SO. ASHLAND AVENUE

→SAFETY



Faster train speeds together with a much greater number of automobiles in service make it imperative from now on that all railroads be armed for safety at railroad-highway grade crossings. Adequate crossing protection is important for the lives, effort, money and good will that it saves and for the slowdowns, inconveniences and losses that it eliminates.

MODEL 10 HIGHWAY CROSSING SIGNALS afford adequate protection because they are designed and built to—

- Block traffic in approach lanes only
- Make vehicles come to a full stop
- Safeguard against second train
- Operate automatically on the closed circuit principle
- Eliminate the human element

Illustrated is just one of the many hundreds of crossings armed for safety with MODEL 10 HIGHWAY CROSSING SIGNALS. Not one fatal accident has ever occurred at crossings where MODEL 10's are on the job.

For complete safety, it's
MODEL 10
HIGHWAY CROSSING SIGNALS

SUPPLY COMPANY
CHICAGO 8, ILLINOIS

U.S. Patent Nos.
2,137,196
2,362,710
2,372,579
Pat. in Canada
June 27, 1939

$64 QUESTION BRINGS A Billion Dollar Answer

Coming out of the war—in which they were called upon to carry more than 90 per cent of the military transportation load—the railroads are being asked this question:

"What are you going to do about peacetime equipment and services?"

And here's the answer for 1946:

A billion dollars' worth of new passenger and freight cars, new locomotives, new and heavier steel rail, new operating facilities, new equipment, materials and supplies of all sorts.

This means new ideas in cars—whole new trains—providing the utmost in safety, comfort, and luxury. New motive power. Better tracks and roadbeds. New standards of dependable, all-season freight service.

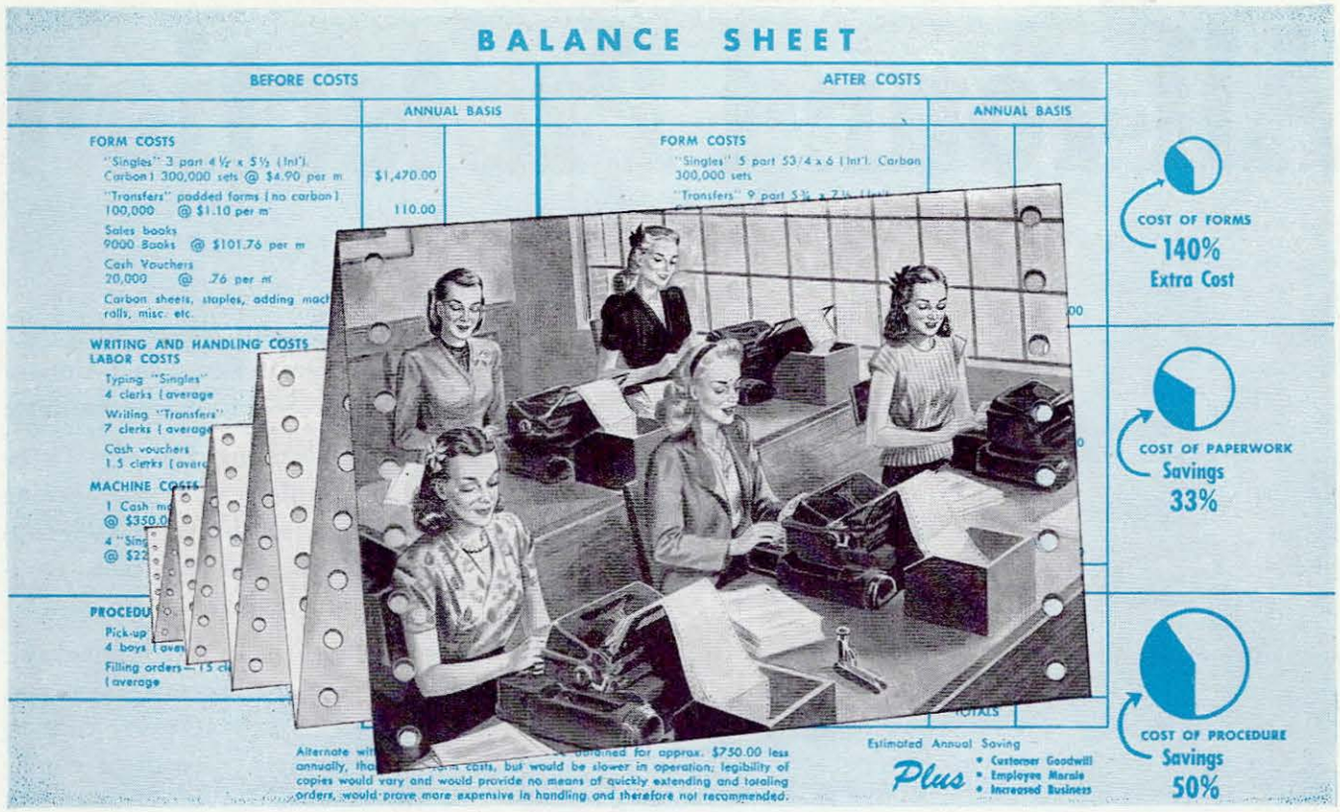
For the future, the answer is to be found in a continuation of railroad research for better transportation service, carried on more actively and on a broader front than ever before.

And all of it—not just the cars and engines, but the roadbeds upon which they run and the fixed facilities they use—is paid for with railroad money—no government subsidy—no federal, state, or municipal aid—no money from the taxpayers. Yes, the railroads pay their own way.

Operating on this self-supporting business basis, the railroads provide America with the greater part of the transportation upon which its future prosperity depends—at a cost averaging well below that of any comparable service anywhere in the world.

AMERICAN RAILROADS

IN PARTNERSHIP WITH ALL AMERICA


BALANCE SHEET
BEFORE COSTS
ANNUAL BASIS
FORM COSTS
"Singles" 3 part 4½ x 5½ (Int'l. Carbon) 300,000 sets @ $4.90 per m
$1,470.00
"Transfers" padded forms (no carbon) 100,000 @ $1.10 per m
110.00
Sales books 9000 Books @ $101.76 per m
Cash Vouchers 20,000 @ .76 per m
Carbon sheets, staples, adding mach rolls, misc. etc.
WRITING AND HANDLING COSTS
LABOR COSTS
Typing "Singles" 4 clerks (average
Writing "Transfers" 7 clerks (average
Cash vouchers 1.5 clerks (avera
MACHINE COSTS
1 Cash m @ $350.0
4 "Sing @ $22
PROCEDU
Pick-up 4 boys (aver
Filling orders—15 cl (average
AFTER COSTS
ANNUAL BASIS
FORM COSTS
"Singles" 5 part 5 3/4 x 6 (Int'l. Carbon 300,000 sets
"Transfers" 9 part 5 3/4 x 7 1/2 (Int'l.
TOTALS
Alternate wit obtained for approx. $750.00 less annually, tha form costs, but would be slower in operation; legibility of copies would vary and would provide no means of quickly extending and totaling orders, would prove more expensive in handling and therefore not recommended.
Estimated Annual Saving
Plus
• Customer Goodwill
• Employee Morale
• Increased Business
COST OF FORMS
140%
Extra Cost
COST OF PAPERWORK
Savings
33%
COST OF PROCEDURE
Savings
50%

EVER LOOK AT A "BALANCE SHEET" OF YOUR RECORD SYSTEMS COST?

Younkers of Iowa did . . . and spent *more* for business forms, to save one-third of annual operating expenses in its mail order department

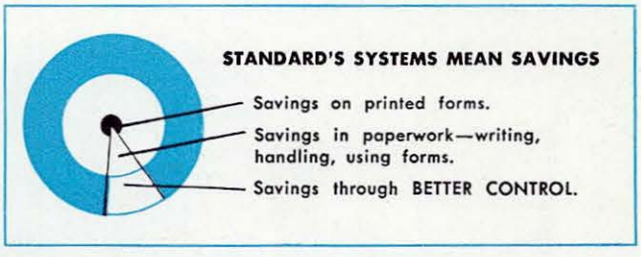
Actually, the executives of Younkers, one of the country's leading department stores, were less concerned with costs than with providing faster mail order service to customers . . . reducing complaints to a minimum . . . tying up fewer employees on the sales floor filling mail orders . . . achieving a more even flow of packages, departmentally, between the stock room and shipping room.

Standard's Paperwork Simplification Techniques found the answers

As frequently happens, the complete answers were found when Standard's representatives came in . . . studied existing procedures and forms . . . applied Standard's paperwork simplification techniques, just as they have in many kinds of businesses.

One of the direct savings is . . . before, approximately 50 sales people throughout the store were used to "fill" mail orders . . . now, it requires 10 full-time clerks utilizing only one-half as much time. The 50 sales people can devote full time to direct sales. This is but one of the many savings throughout the whole operation. Centralized writing of all records was the answer . . . with the aid of a better writing method and Standard's scientifically designed Kant-Slip continuous forms.

The dollar result . . . 50 per cent saved in filling orders . . . 33 per cent saved in the overall operation of writing and handling records. Benefits of better control . . . improved customer goodwill through faster, better service . . . improved employee satisfaction are almost incalculable.


STANDARD'S SYSTEMS MEAN SAVINGS
Savings on printed forms.
Savings in paperwork—writing, handling, using forms.
Savings through BETTER CONTROL.

Does your business, whether manufacturing, distribution, service, offer similar opportunities for savings? Talk to a Standard Register representative, learn how other companies gain savings beyond the cost of printed forms . . . where savings are greater.

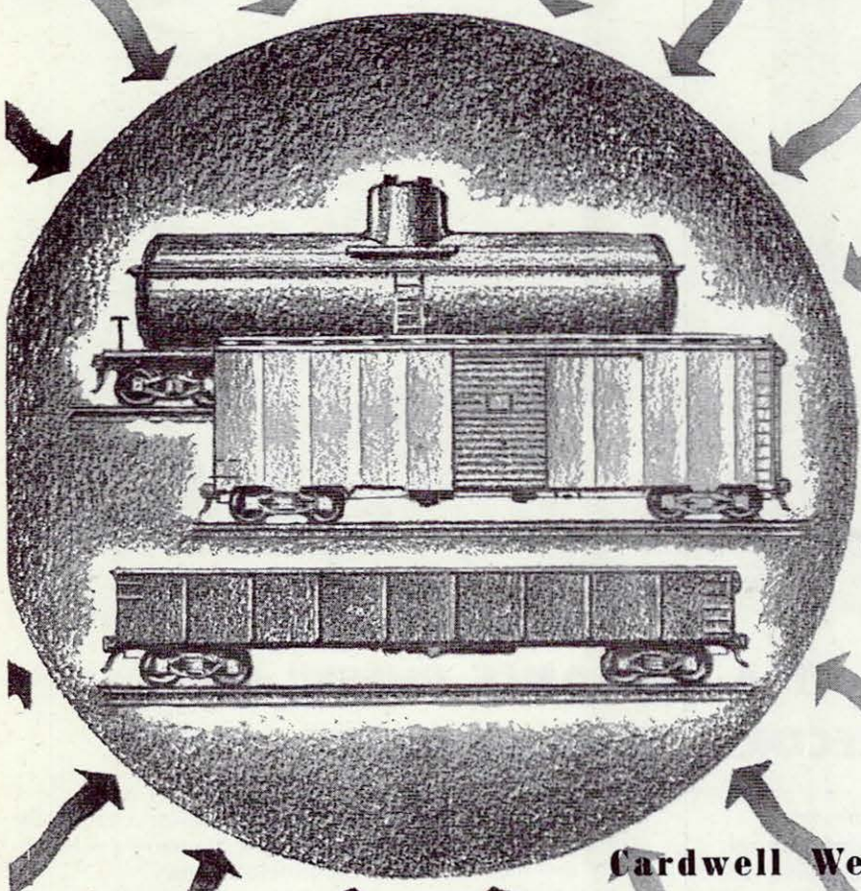
WRITE TODAY for Formcraft Digest D-194 which explains the above system in detail. Also, ask for "A New Frontier In Business." Find out just HOW MUCH you can buy in business forms today.

THE STANDARD REGISTER COMPANY

Manufacturer of Record Systems of Control for Business and Industry
1103 Campbell St., Dayton, Ohio

Pacific Coast: Sunset McKee-Standard Register Sales Co., Oakland, California. Canada: R. L. Crain Limited, Ottawa. London: W. H. Smith & Son, Ltd.

All-round Protection



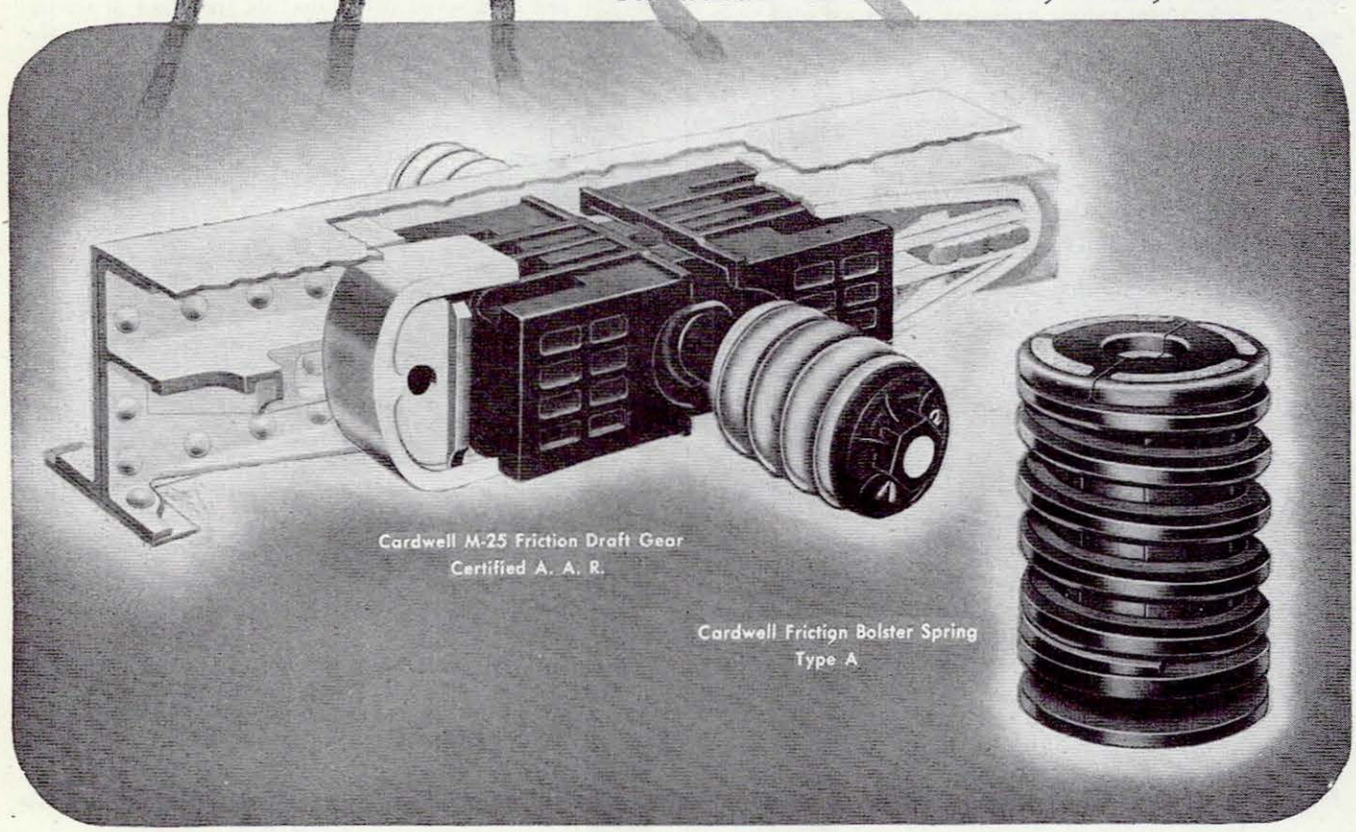
Cardwell and Westinghouse Friction Draft Gears and Bolster Springs protect Cars and Ladings:

— By absorbing the shocks to which couplers, cars and lading are otherwise subjected in coupling, starting, operating and stopping trains or cars.

— By absorbing the bumps and bouncing caused by rail joints, and the shocks and stresses due to curves and other roadbed conditions which build up sidesway and rocking.

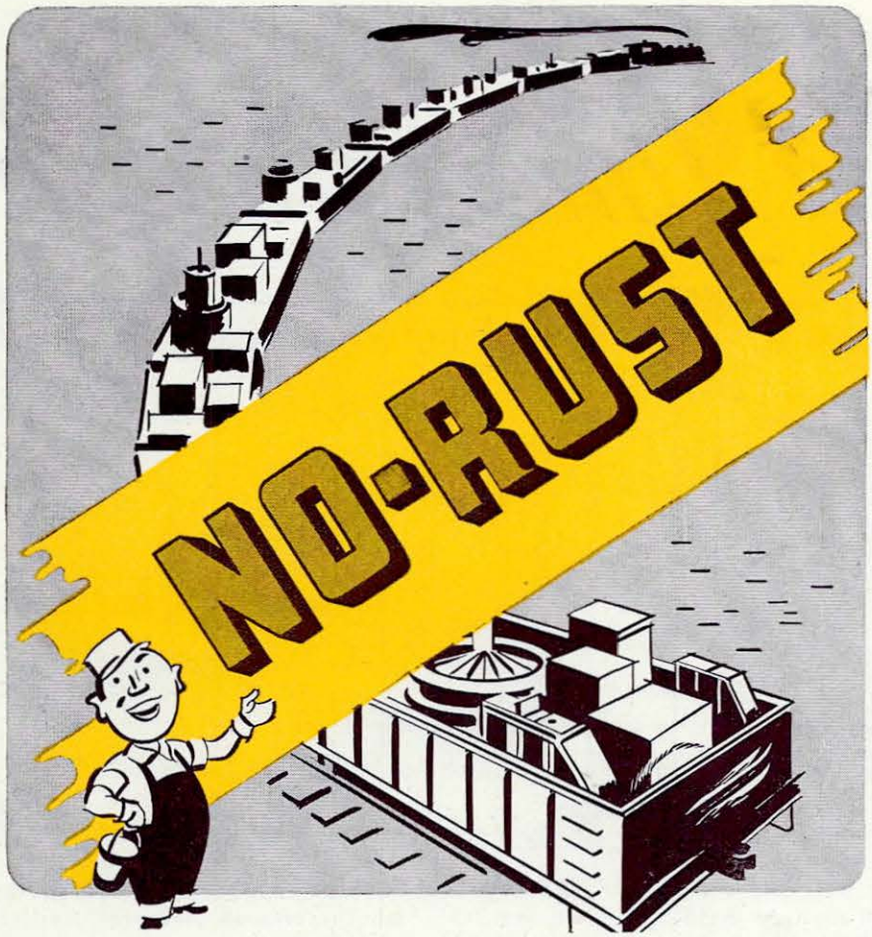
Over 98% of the cars in freight carrying service are A. A. R. construction, and over 96% have Friction Draft Gears.

Cardwell Westinghouse Co., Chicago
Canadian Cardwell Co., Ltd., Montreal



Cardwell M-25 Friction Draft Gear
Certified A. A. R.

Cardwell Friction Bolster Spring
Type A



"YOUR SHIPMENT ARRIVED IN A-1 SHAPE"!

New enough to be different — Old enough to be proved . . . Coast-to-Coast and around the world! A few dollars of **NO-RUST** are saving millions in material, precision machining, time, labor, reputation, profit, sales, in products **stored** and in **transit. NO-RUST** is saving 1000's of dollars in maintenance costs for several Railroad Systems in all parts of the country. Without protection, the risk is sure—loss complete. With **NO-RUST** all is saved!

RAILROADS SAVE

—in the shop—in the yard—on the Line—on the books—with **NO-RUST.** 100% protection of iron and steel materials and equipment—in storage and in transit. Railroads are therefore big users of **NO-RUST.** There is a Special **NO-RUST** for railroads knows as "Car Journal Compound."

ONE SAMPLE leads to continuous use. Easy to apply—dries fast, hard, smooth—resists wear, abrasion, chipping—stays indefinitely—easily removed. *A little goes a long way — to save money. Write for adequate sample — today!*

Frost PAINT AND OIL CORPORATION

"The EXACT Finish for EXACTING Needs"

1209 N. E. TYLER ST. • MINNEAPOLIS 13, MINN.

Notes on Protection

By M. C. SLACK

Vice President Frost Paint and Oil Corp.

100% — OR NONE

It is not enough that a compound prevent the meeting of the surface of iron with water and oxygen, in order to be an efficient, positive, dependable rust preventative. It must not only have complete coverage at the time of application, but also, it must stay complete constantly up to the time its use is no longer required.

When there are several holes in the bottom of a row boat, it is not enough that all but one of them should be plugged. When there are more than one puncture in an inner tube, all of them must be securely patched in order that the tire shall be serviceable.

Similarly, one scratch or abrasion through the protective coating that exposes the metal to the factors of rust, is sufficient to ruin the condition of the piece.

For this reason, NO-RUST, produced by the Frost Paint & Oil Corporation, is formulated to flow freely for complete, microscopic coverage, and to withstand the shocks of handling, abrasion, wear and chipping, in all climates and conditions, and for an indefinitely long period of time.

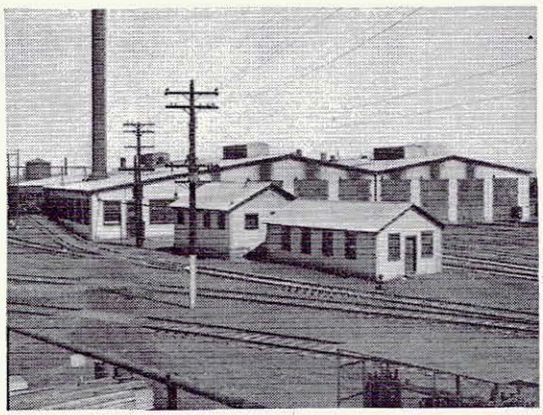
PERSONALIZED FINISHES

The Frost Paint & Oil Corporation have developed a Protective Service that is unique in the industry. Their Service Engineers go right into the room or department that is to be refinished. They analyze every existing factor that can have a bearing upon the type of finish required for positive and constant protection. All factors, such as chemicals, fumes, fungi, temperatures, humidity, and requirements for light reflection are analyzed and tested. The formula is especially developed for each department and use, and filed for ready reference. Finishes thus formulated have built up a reputation for exceptional service.

The Frost Paint & Oil Corporation of Minneapolis, Minnesota, will be pleased to acquaint anyone interested, with the details of their Personalized Finishes for EXACTING Needs.—Adv.

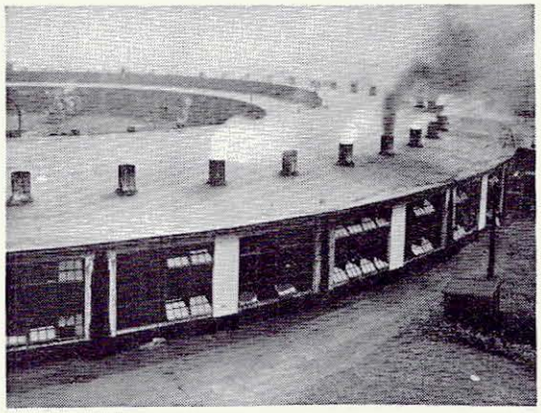
Six Old Timers from the

CORRUGATED TRANSITE



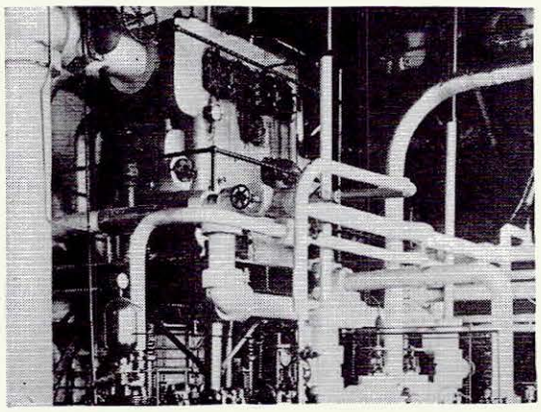
20 Years of Service—Twenty years ago, the engine house, power plant and small auxiliary buildings in this yard were sheathed with Johns-Manville Corrugated Transite, the asbestos-cement building material that cannot burn, rot or corrode. Today, there is no sign of deterioration, and maintenance has been negligible.

BUILT-UP ROOFING



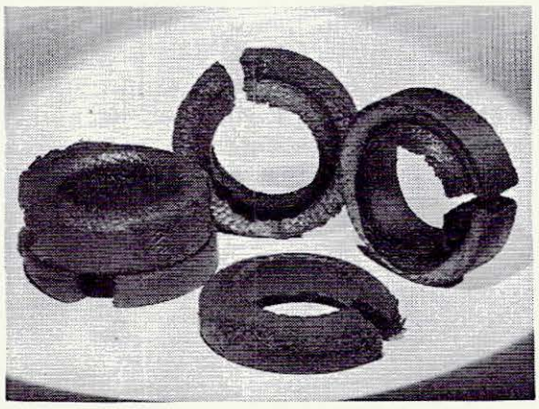
32 Years of Service—One of many "old timers" among J-M Smooth-surfaced Asbestos Built-Up Roofs on railroad buildings, this one has been in service since 1914. Although constantly exposed to destructive engine-house gases, as well as extremes of heat and cold, it is still in sound condition. Maintenance: none whatever.

INSULATION



23 Years of Service—For 23 years, Johns-Manville Insulations have conserved fuel in this large railroad power plant—with no loss in thermal efficiency. Considering the size of the installation (nearly 1800 lineal feet of pipe covering alone) maintenance has been exceptionally low—less than an average of $10 per year.

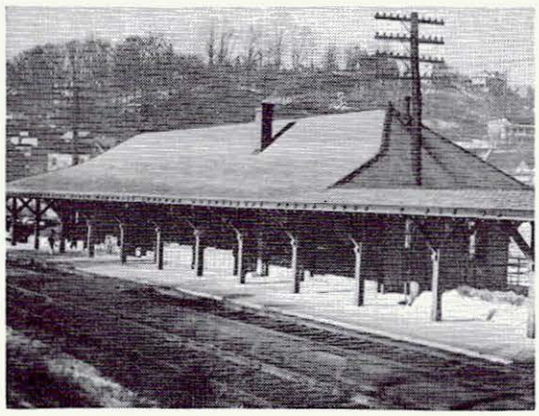
PACKING



22 Years of Service—Shown above is a set of Johns-Manville Sea Rings just as they looked after a 22-year "tour of duty." During that time, they were in continuous operation 14 hours per day on an Ingersoll Rand air compressor. Note the slight amount of wear—evidence that these packings were still good for further service!

Johns-Manville Album

ASBESTOS SHINGLES



32 Years of Service—Since 1914, Johns-Manville Asbestos Shingles have withstood summer's heat and winter's snow and ice on the station roof above. And these fireproof, rotproof shingles are still as serviceable as ever. On hundreds of railroad buildings, they are providing this same maintenance-free performance.

ASPHALT TILE FLOORING

18 Years of Service—The floor of Johns-Manville Asphalt Tile in this railroad Y.M.C.A. has taken a severe beating. Heavy work shoes carrying cinders, dirt, snow and mud have scuffed at it for 18 years. Yet it is still in good condition—and except for cleaning, not one cent has ever been spent for maintenance or repairs.

THE six Johns-Manville installations pictured—a few of many "old timers" in our files—have a combined length of service of 147 years. And except for the Sea Rings, which have been "retired" after 22 years of continuous operation, all are still on the job!

Such performance is not unusual. Rather, it is the kind of service America's railroads *take for granted* from these and other Johns-Manville asbestos products. By insuring long-term protection to buildings and equipment . . . by reducing "time out" for repairs . . . and by eliminating frequent replacements, they contribute to low maintenance in every department of railroad operation.

For complete details, write Johns-Manville at New York, Chicago, Cleveland, St. Louis or San Francisco.

JOHNS-MANVILLE JM PRODUCTS

JOHNS-MANVILLE

88 YEARS OF SERVICE TO TRANSPORTATION

Insulation • Friction Materials • Packings • Refractory Cements • Building Materials

AIR-CONDITIONING *needs draftless* AIR-DIFFUSION!

Club car of the Seaboard Railway's streamlined train "The Silver Meteor." Ceiling ANEMOSTATS spaced between fluorescent light fixtures provide *draftless* air distribution throughout the car.

Conditioned air blown into a passenger-train car through old-fashioned grilles, registers, or slots creates drafts, permits stale air-pockets and stratification of temperature and humidity. Such annoyances can make the best air-conditioning system a nuisance instead of a comfort to travelers. These are problems of *air-diffusion.*

ANEMOSTAT draftless air-diffusers solve air-diffusion problems. Thousands of ANEMOSTAT installations are conclusive evidence that *air-conditioning needs air-diffusion.*

Due to its design (patented) the ANEMOSTAT distributes air of any duct velocity in a multiplicity of planes traveling in all directions. Simultaneously, it creates a series of counter-currents which siphon car-air equal to about 35% of the supply air *into the device,* where it is mixed with the supply air before it is discharged. The ANEMOSTAT effects air expansion within the device, which instantly reduces velocity

For years ANEMOSTATS installed on the air conditioning systems of passenger-train cars have protected passengers from blasts of cold air, stuffy air pockets, inadequate circulation . . . assured the full travel-promoting value of air-conditioning. ANEMOSTATS can be installed in coaches already air-conditioned as well as in new coaches.

Write today for further details.

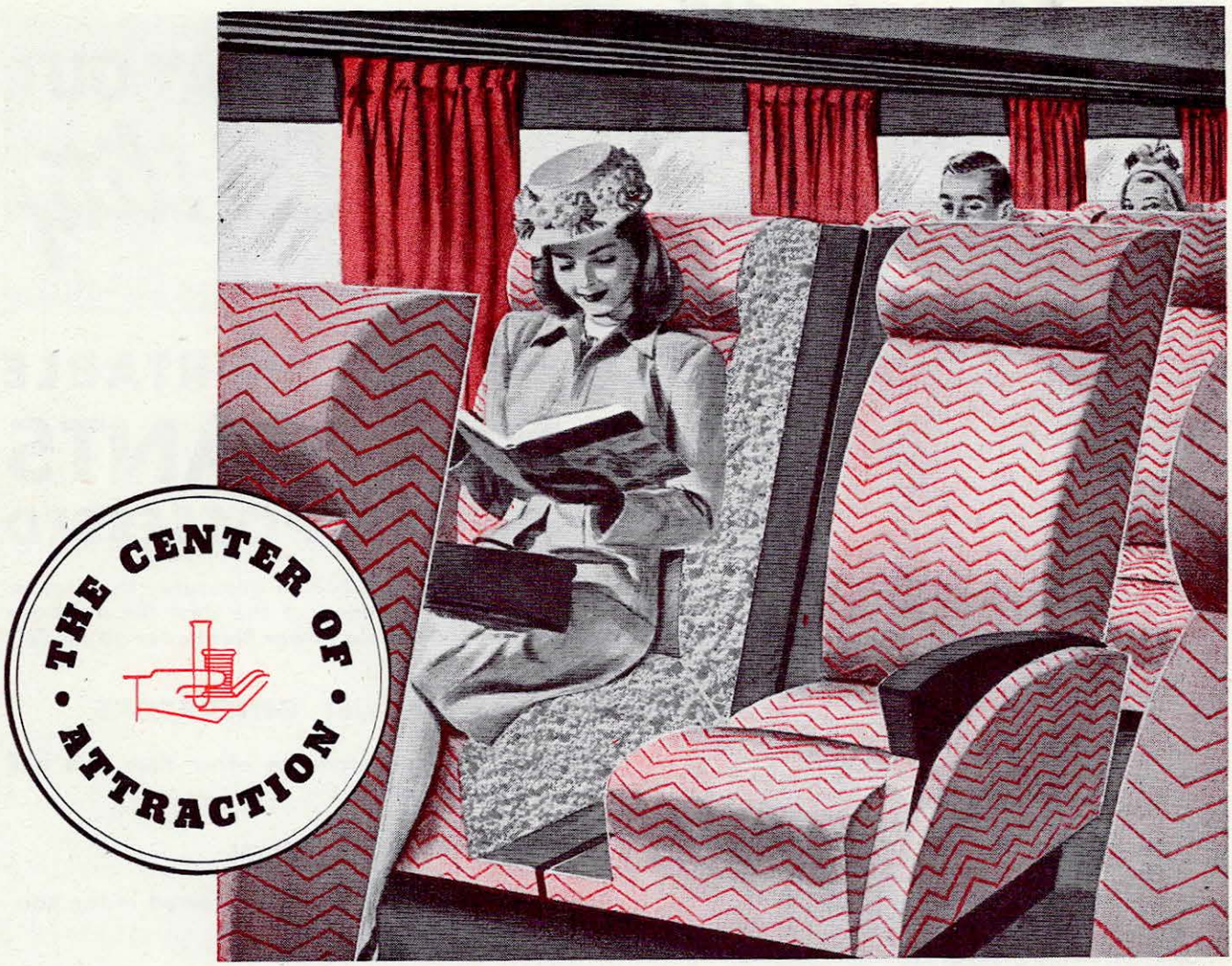
Veteran-ize your personnel!
Many discharged war veterans received valuable technical and specialized training. Always consider veterans when you employ. They did their share —now let's all do ours!

ANEMOSTAT
REG. U. S. PAT. OFF.

ANEMOSTAT CORPORATION OF AMERICA
10 EAST 39th STREET • NEW YORK 16, N. Y.

AC-1033

"NO AIR-CONDITIONING SYSTEM IS BETTER THAN ITS AIR-DISTRIBUTION"



in tomorrow's bus

*Velon** fabric over FOAMEX* cushioning

THEY'RE irresistible to passengers — luxurious *Velon* beauty, *Foamex* floating comfort. They're a star combination for your budget — both practically wearproof!

***Velon* upholstery fabric** — in the lightest, brightest, shades — stays clean longer because grease and grime can't dig their way into its non-porous threads. A damp cloth restores *Velon's* original beauty. The fabric will not sag or "grow" out of shape — stays looking new because *Velon's* homogeneous threads resist abrasion, scuffing, snagging to an amazing degree.

***Foamex* cushioning** keeps its comfort and shape indefinitely because it replaces old-style springs and stuffing with one simple, welded-together material — sag-proof, lump-proof. Foamed of millions of tiny air-and-latex cells, *Foamex* cradles passengers in delightful buoyancy. Each cell is a perfect little cushion, a shock absorber, a breathing ventilator to keep seating cool and fresh.

Write Firestone, Akron, for information. Ask regular sources for *Velon* fabrics and *Foamex* cushioning or let Firestone send them samples and information.

BEST TODAY··· STILL BETTER TOMORROW

Listen to the Voice of Firestone Monday Evenings over NBC

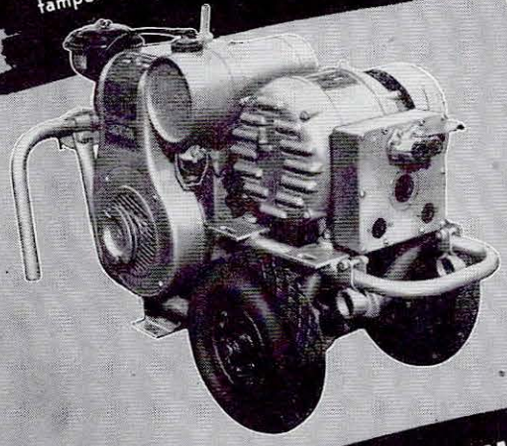
Firestone

*TRADE MARK

Continuous DAY IN *and* DAY OUT *Dependability*

JACKSON MODEL M-1
1.25 K.V.A., continuous duty. Operates 2 JACKSON Tampers, or lights and B&B tools to full rated capacity. Particularly advantageous for spotting operations. Weighs only 243 lbs.

JACKSON MODEL M-2
2.5 K.V.A., continuous duty. Operates 4 JACKSON Tampers, or lights and B&B tools to full rated capacity. Two of these units are ideal for an 8-tamper organization. Easily portable.



SUCH AS NO PORTABLE POWER PLANTS *EVER* BEFORE *POSSESSED*

Time out and crew "hold-ups" due to generator troubles or necessary adjustments are a thing of the past for all those using the new JACKSON Portable Power Plants, for all models are equipped with

★ **PERMANENT MAGNET GENERATORS**

★ Which require no maintenance other than two ball bearings running in oil.

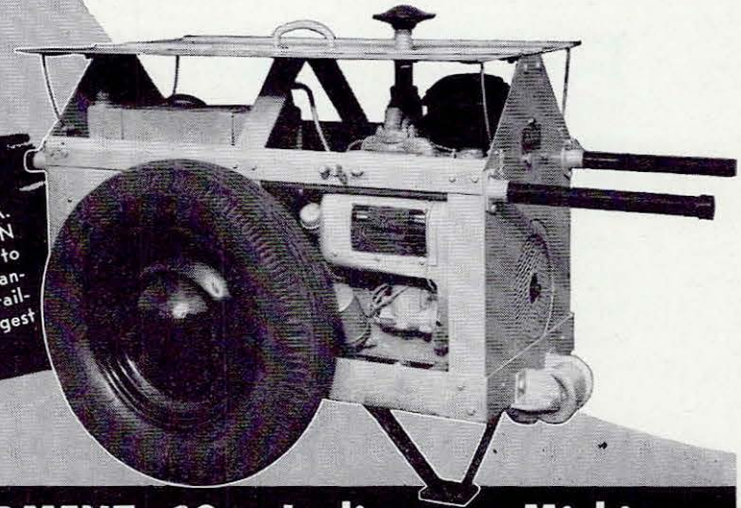
★ Require no adjustments whatsoever.

★ Have less than 1/6 the parts contained in the conventional generator.

★ Are practically TROUBLE-PROOF.

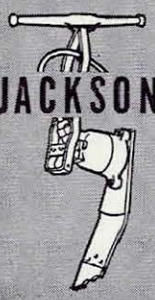
★ AND DELIVER BOTH SINGLE PHASE AND 3 PHASE 60 CYCLE, 115 VOLT A.C. TO THEIR FULL RATED CAPACITIES.

Add to this the fact that they incorporate the most reliable of engines and typical JACKSON quality construction throughout, and you have DEPENDABILITY **such as no other Power Plants have ever before possessed** — the ideal source of power for operating 2, 4, 8 and 12 tamper outfits, a wide range of B & B tools and lights. Get the facts. Write NOW!

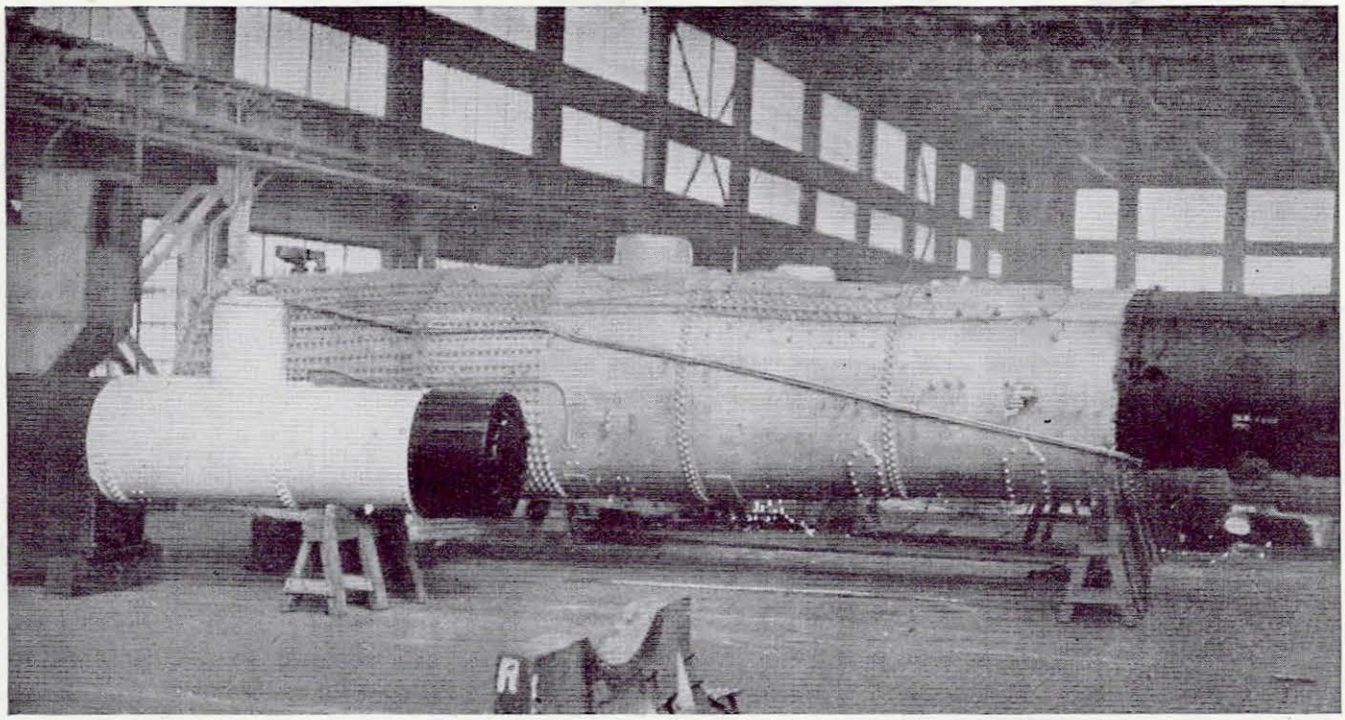


JACKSON

JACKSON MODEL M-4
5 K.V.A., continuous duty. 7.5 K.V.A. intermittent. Operates 12 JACKSON Tampers, or lights and B&B tools to full rated capacity. 4 telescoping handles, standard auto tires and rail-riding wheel make even this largest model easily maneuverable.



ELECTRIC TAMPER & EQUIPMENT CO., Ludington, Michigan



THE LONG AND THE SHORT OF *Boiler Protection*

These two boiler shells, a striking contrast in size, are equal in one important respect — their outstanding ability to resist corrosion. Each has received internal sand-blasting and two brush-applied coats of APEXIOR NUMBER 1 — a protective treatment that will prolong their service life indefinitely. It makes cleaning easier since it provides a permanent base, and the APEXIOR will require no attention for years. This treatment is equally effective on old metal, even in cases of advanced corrosion.

The "Film of Safety"

APEXIOR NUMBER 1 fills every pore and joint of the metal surface, forming a water-and-steam-tight shield effective under all temperatures and pressures. Besides sealing off the metal from corrosive contact, it acts as a mechanical barrier that minimizes operating deposits and prevents their tight chemical bonding. Heat transfer is aided on heat transfer surfaces by this reduction of insulating accumulations and by the high conductivity of the coating — and boiler cleaning is much easier.

While APEXIOR NUMBER 1 is not a substitute for feedwater treatment, it aids this operation by improving the surface quality of boiler metal, without affecting or being affected by the chemicals used. Motive power departments find that the regular use of APEXIOR NUMBER 1 greatly reduces maintenance on thousands of locomotives subject to I.C.C. inspection.

APEXIOR NUMBER 3

This companion product is a dense, shiny-black protective coating that seals off metal from water contact at all temperatures ordinarily encountered on the interiors of locomotive tender cisterns. Brush-applied, it affords lasting protection against corrosion and, being non-toxic, is absolutely safe for use in drinking-water tanks.

Quick Deliveries

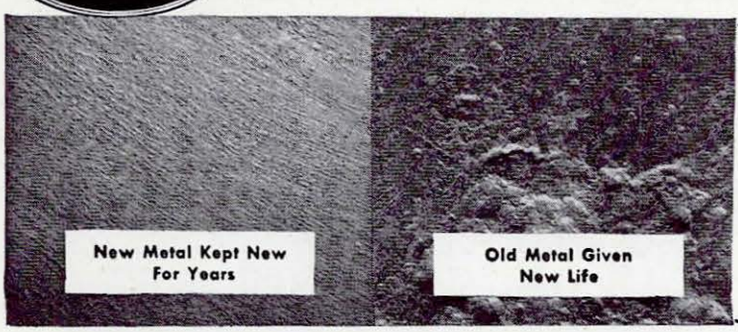
APEXIOR coatings are now obtainable for prompt shipment to railroads, industrial power plants, utilities and marine users everywhere. See information in *Locomotive Cyclopaedia and write for new free bulletin.*

Two new high-temperature Dampney coatings are Thur-Ma-Lox Number 7 Black (1600°F.) and Thur-Ma-Lox Number 10 Aluminum (1200°F.). Properly applied, they provide lasting protection to dry metal surfaces subjected to extreme temperatures indicated.

APEXIOR

Keeps new metal new... Gives old metal new life

DAMPNEY



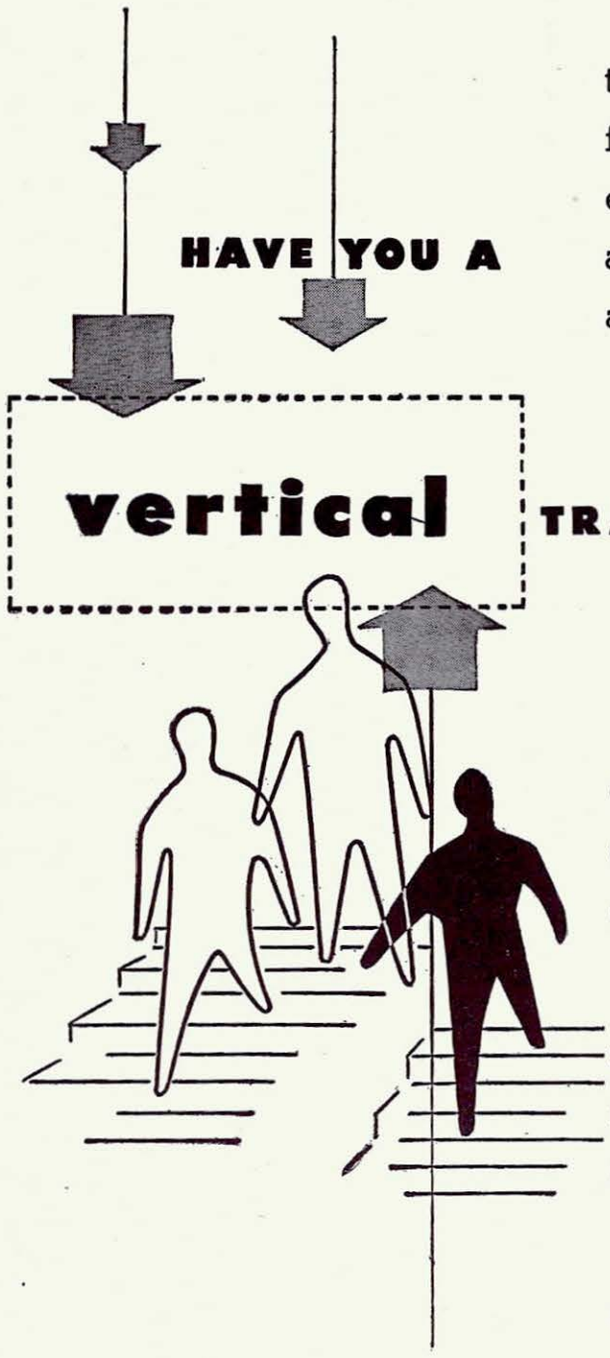
THE DAMPNEY COMPANY OF AMERICA
1237 River Street
Hyde Park, Boston 36, Mass.
Please send free Bulletin.

Name.....

Company.....

Address.....

.....



Otis elevators, Otis escalators, Otis trained men and the facilities of the manufacturers of more than half of the world's elevator equipment are all available to assist you or your Architect in solving any vertical transportation problem.

TRANSPORTATION PROBLEM?

Otis Passenger Elevators with up-to-date dispatching methods are the recognized answer to congested elevator traffic conditions.

Otis Escalators are used where large numbers of persons are to be carried from floor to floor in comfort and without crowding.

Otis Freight Elevators with a variety of control systems are designed to satisfy the most exacting requirements of floor to floor freight handling.

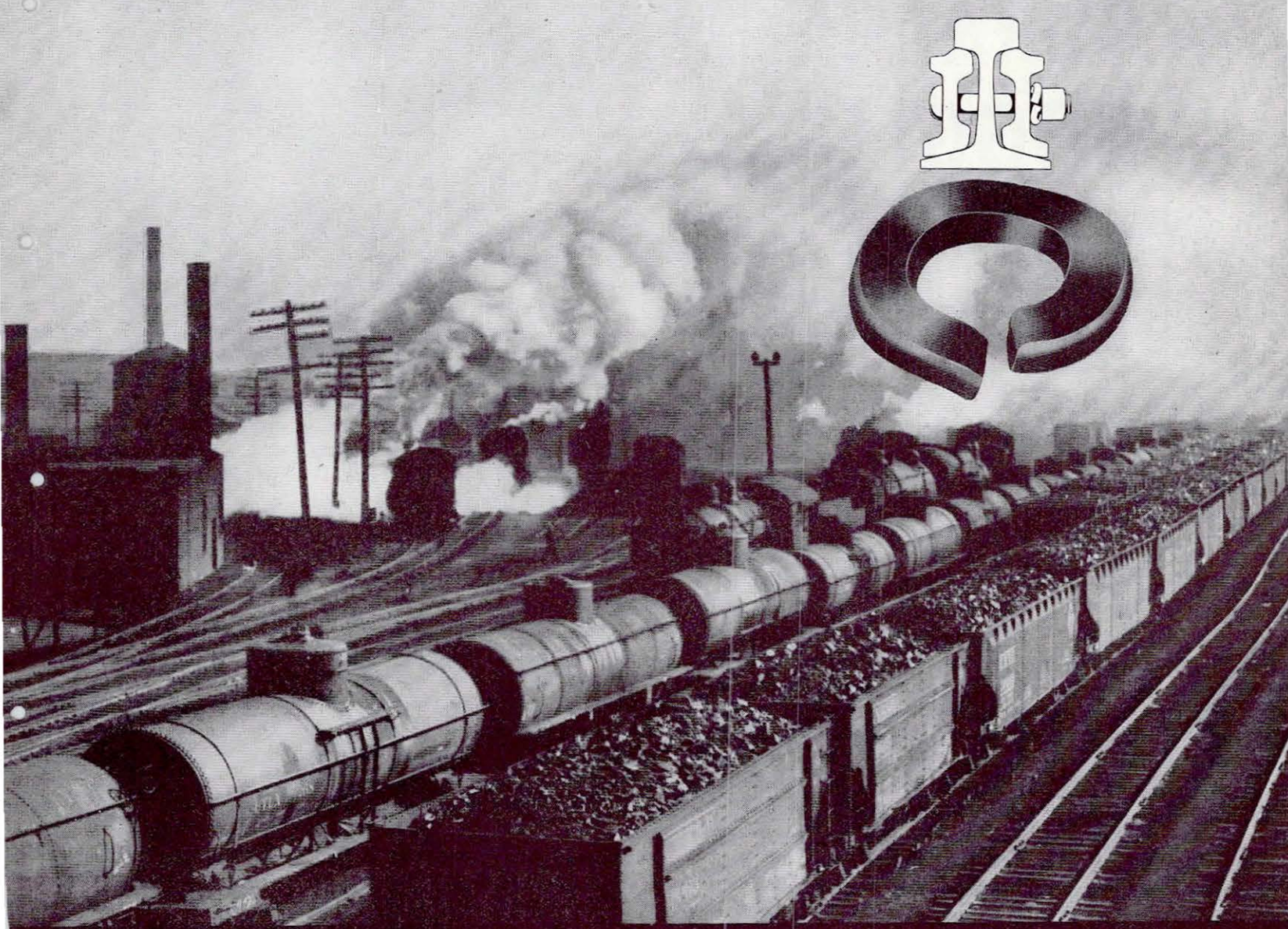
For the most efficient and economical service in vertical transportation — for a few stories or many — call your nearest Otis Representative today.

Otis ELEVATOR COMPANY
OFFICES IN ALL PRINCIPAL CITIES

Track maintenance is a terrific job under the incessant pounding of today's heavy traffic loads. Improved Hipower spring washers help do that tough job.

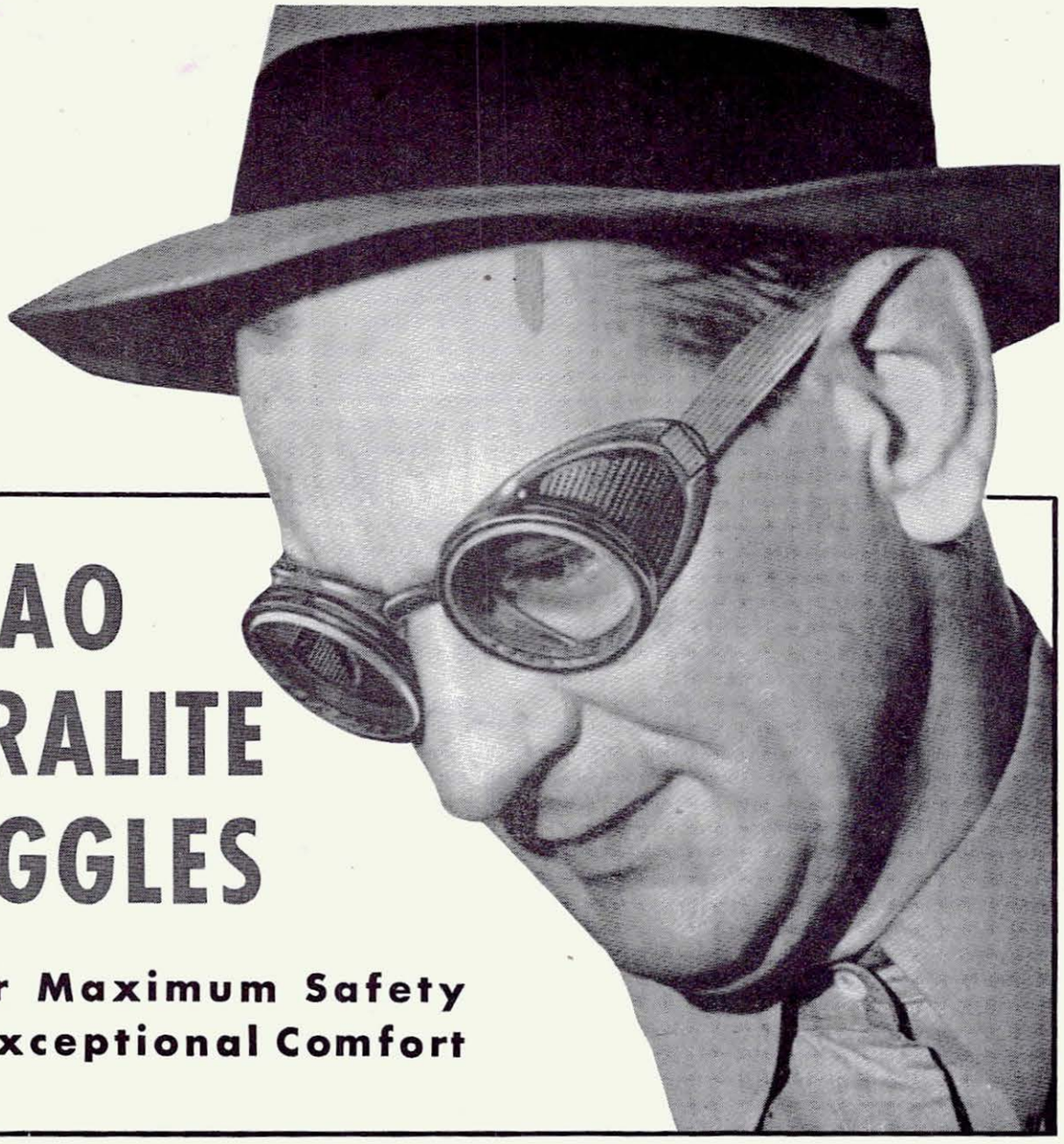
IMPROVED HIPOWERS

IMPROVE TRACK



THE NATIONAL LOCK WASHER COMPANY, NEWARK, 5, N. J., U. S. A

A COMPLETE LINE OF RAILWAY SPRING WASHERS



AO DURALITE GOGGLES

. . . for Maximum Safety with Exceptional Comfort

Improved AO Duralite Goggles provide comfortable eye protection against flying particles coming from any direction. Anatomically molded individual eyecups fit snugly against the face, but ample ventilation is provided through serrations and perforations. Easily adjustable one-piece headband resists perspiration, oil, water and grease; fits snugly. Adjustable ball-chain bridge has curved plastic tube insulation for comfortable close fit. Obtainable with 50 mm. Super Armorplate clear lenses or with Calobar lenses in medium, dark or extra dark shades. Also made with 6-Curve Super Armorplate clear or Calobar lenses at slightly additional cost. . . . No. 321A Coverglas, shown in insert, is recommended for workers who wear glasses and need eye protection for short intervals of time. . . . Phone or write your nearest AO Safety Representative. He will be glad to give you a demonstration of AO Duralite Goggles.

American Optical

COMPANY

SOUTHBRIDGE, MASSACHUSETTS

Safety Division

BRANCHES IN PRINCIPAL INDUSTRIAL CITIES

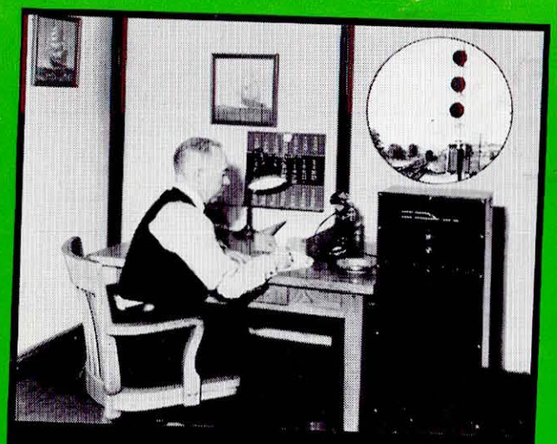
G-R-S MODERN SIGNAL SYSTEMS KEEP TRAFFIC MOVING

CENTRALIZED TRAFFIC CONTROL

Eighteen years ago G-R-S installed the first Centralized Traffic Control System. Since that time, G-R-S CTC on thousands of miles of track have shown results such as:

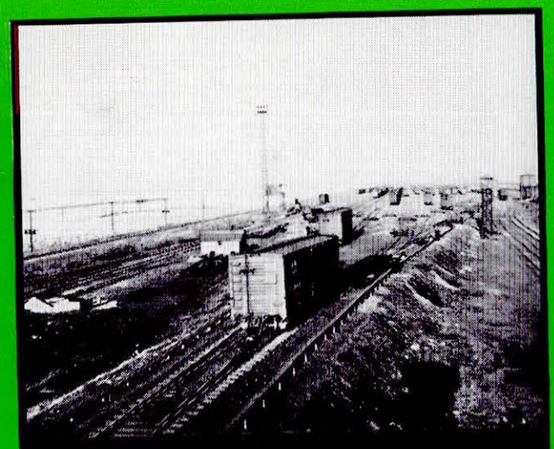
INCREASED GROSS TON MILES PER TRAIN HOUR	7 to 57%
MINUTES SAVED PER FREIGHT TRAIN MILE	.50 to 1.89
TIME SAVED PER FREIGHT TRAIN TRIP	17 to 32%
RETURN ON INVESTMENT (PER ANNUM)	12.7 to 120%

Other benefits not easily computed into round figures are: increased track capacity; postponement of double tracking; increased availability of locomotives, cars and men; and savings in critical materials.



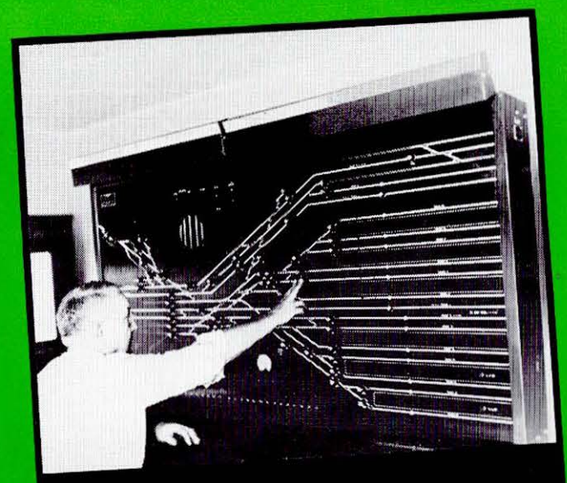
REMOTE CONTROL

Provides a simple, inexpensive means of operating electrically, switches and signals at passing sidings, ends of double track, crossings, junctions, yard approaches, drawbridges and similar layouts from a conveniently located control point nearby or several miles distant. Eliminating tonnage train stops, operating costs are decreased by reducing delays and fuel consumption.



CAR RETARDERS

Approximately 1/3 of the time required to move railroad freight from its point of origin to its destination is lost in classification yards. On roads where these systems are in use, classification time has been cut an average of 50%. These installations have also shown substantial savings in personnel and yard locomotive requirements.

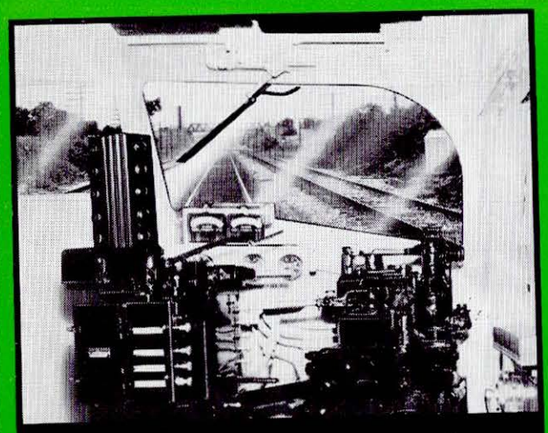


THE NX SYSTEM OF ELECTRIC INTERLOCKING

Its name, "NX", means eNtrance-eXit. It is a simplified system of directing trains through busy terminals. To line up a route, the operator merely pushes an eNtrance knob and an eXit button in the route desired on his control panel—NX takes over—throwing switches, clearing signals and indicating the train's progress by lights.

AUTOMATIC BLOCK SIGNALS

There are nearly 99,000 track miles of automatic block signaling now in use on American railroads. On single- or multiple-track lines Automatic Block Signals increase track capacity, improve operating efficiency and increase safety —thus effecting economies.



CAB SIGNALS

One of the outstanding developments of modern signaling which has demonstrated its economy through better and faster operation with maximum safety. G-R-S Cab Signals may be used with or without Automatic Train Control – or – with or without Wayside Signals.

CODED TRACK CIRCUITS

Your rails are potential signal line wires. By their use with G-R-S Coded Track Circuit Control, you can be assured of proper signal operation regardless of weather. You can be assured of improved shunting sensitivity and greater protection against the effects of foreign current. You can also eliminate or reduce costly open line wires.

GRS

General Railway Signal Company

GRS

A-2043

You Are Invited

to view a brief presentation of modern methods for expediting traffic...

on your Main Lines, in your Terminals and through your Classification Yards.

with GRS Signal Systems and Appliances

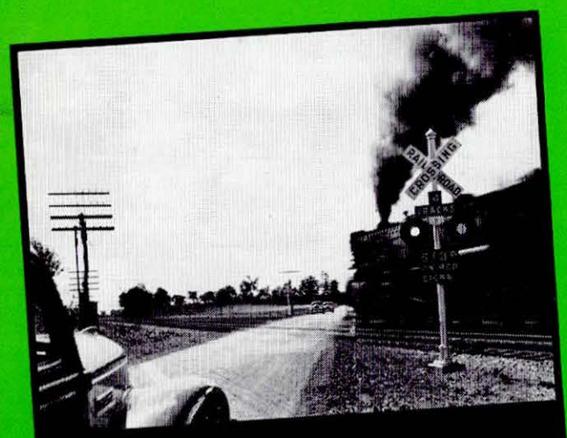
G-R-S SIGNAL APPLIANCES

"TYPE A" FACING POINT LOCKS

Provide the protection necessary at spring switches to permit high-speed facing moves with the same absolute safety as at interlocked switches. Use them to obtain full realization of the maximum operating advantages of your spring switches. They are applicable to any existing spring switch arrangement.

TYPE "SA" SEARCHLIGHT SIGNALS

They have all the features requisite to modern high-speed rail transportation. 18 years service has proven their dependability. They are designed for use with any signaling system; they will meet any topographical condition; and they can be arranged for operation on any source of power. 87 different railroads are using them today.



HIGHWAY CROSSING PROTECTION

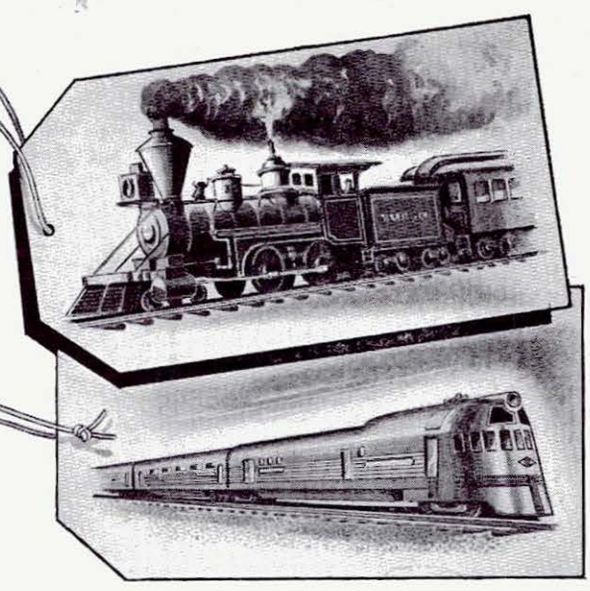
G-R-S Highway Crossing equipment is supplied to meet your particular requirements in accord with the latest A.A.R. specifications. These crossing signals are a definite assurance of protection, second only to grade separation. They provide a very effective, dependable and economical means of protection.

ROLLER BEARINGS

For easier switch operation. The trend toward longer switches and heavier rails has emphasized the need for reducing friction at both hand- and power-operated switches. G-R-S Roller Bearings are easy to install and efficient in operation.

GRS *General Railway Signal Company* GRS

AVAILABLE TO YOU:
77 YEARS' EXPERIENCE
in meeting railroad electrical needs



EVER SINCE GRAYBAR supplied rail transportation's first electrical apparatus, the telegraph, we have been providing the nation's railroads with an increasing variety of supplies — ranging from wire to pole-line construction equipment and tools . . . telephone dispatching systems to welding equipment . . . motors to lamps.

Graybar's day-to-day, coast-to-coast contact with railroads now means expert help in choosing, supplying, and applying the best electrical items to meet a wide range of requirements.

THE WAR'S OVER, BUT . . .

The ability of America's railroads to "keep 'em rolling" throughout the war is an achievement which long will be admired by all who realize the difficulties which the railroads faced — and overcame. Naturally we at Graybar are pleased when railroad men tell us how much our service helped—through continual delivery of essential electrical needs in spite of procurement difficulties. Our policy of rendering more-than-the-usual service is in force today — and will be continued tomorrow.

If you aren't already receiving the benefits of Graybar service, we suggest that you let us demonstrate them to you. All the items we distribute are first-quality products—of over 200 leading manufacturers. Our nation-wide warehousing system speeds delivery of available items. You'll find that our Railroad Department appreciates your electrical problems and is outstandingly equipped to help solve them. *Graybar Electric Company. Executive offices: Graybar Building, New York 17, N. Y.* 4638

Offices and Warehouses
IN OVER 90 PRINCIPAL CITIES

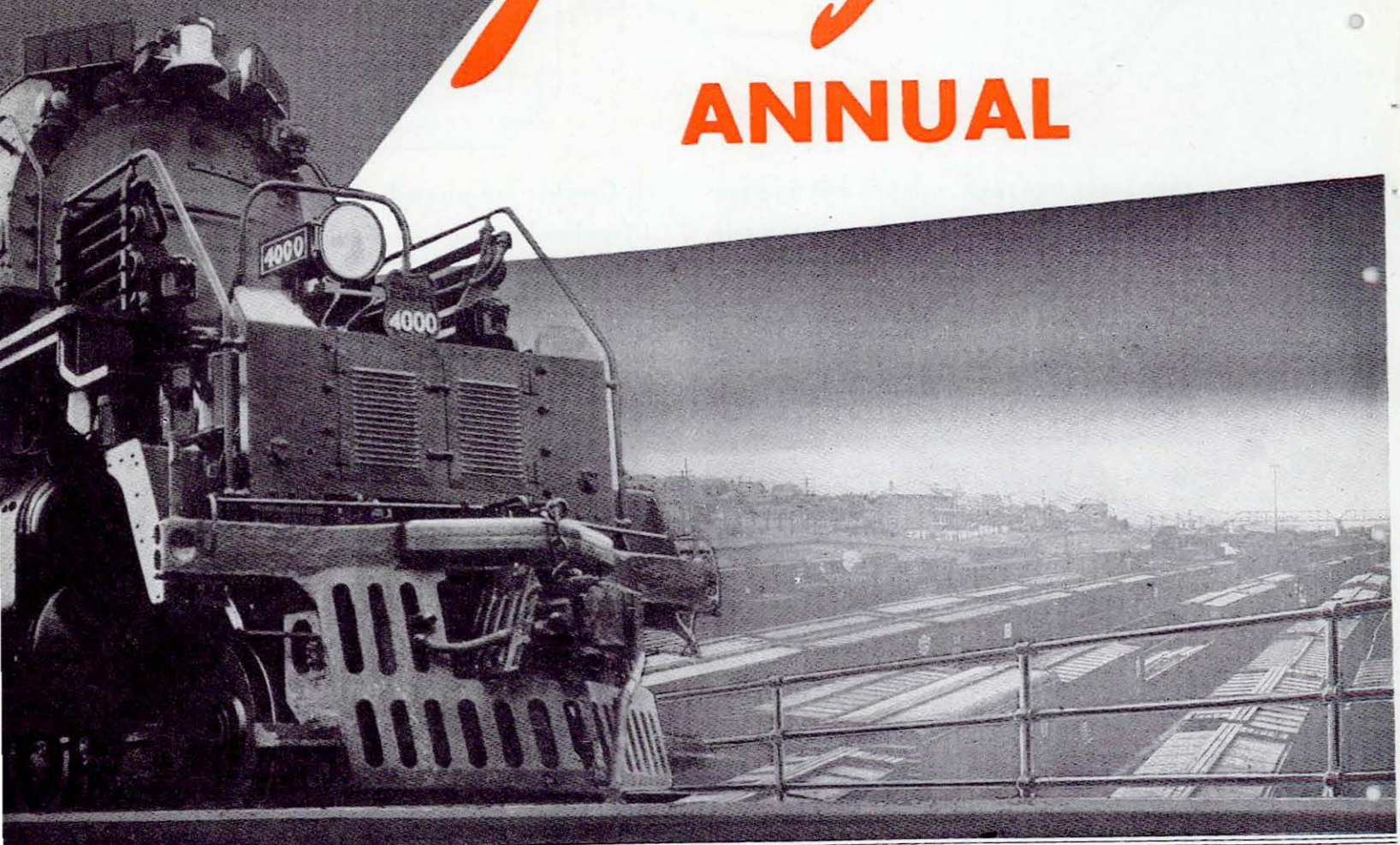
via GraybaR

60 000 ELECTRICAL ITEMS ARE DISTRIBUTED THROUGHOUT THE NATION

SEVENTH

Freight Progress

ANNUAL



Railway Age

. . . reporting and projecting new and prospective developments in railway freight service and equipment . . . highlighting the new era of competitive freight transportation

May 18, 1946 Issue

Closes April 26

The Dramatic Story of

FREIGHT PROGRESS

Will Be Chronicled in the May 18, 1946, Issue of

Railway Age

THE Freight Progress Annual of the *Railway Age* will again carry the highly dramatic story of railway freight service . . . reaching all interested groups with a full report of what is being done, *and what must be done*, to keep pace with the problems of competitive freight transportation.

The Freight Progress Annual this year will be an authoritative chronicle of the new and prospective freight conditions facing the railway industry, as surveyed and projected by the fact-finding economics, engineering and news experts who comprise the *Railway Age* editorial staff.

The May 18 issue will present the shipper's own views on what he needs and wants in railway service . . . what the railroads are doing and planning to do to improve and expedite service . . . the trends and developments in motive power and freight cars . . . the importance of improved freight house operations . . . the part played by roadway, track, bridges, terminal facilities . . . the advantages of modern signaling and train communication in promoting greater safety and greater speed in freight service.

The entire theme of the Freight Progress Annual will serve to indicate the advances in railway freight service, and will stimulate greater interest in the present era of Freight Progress.

The distribution of the 1946 Freight Progress Annual will be expanded over the regular *Railway Age* circulation to include the nation's important shippers, a selected list of members of the House and Senate and other important government officials. Thus, this issue will serve to focus the attention of all groups involved in transportation on railway freight service developments for 1946.

For further information regarding the Freight Progress Annual, write to the *Railway Age* office nearest you.

Highlights of Editorial Program

Editorial Comment— What the shippers must have in the way of freight service, and how far the railroads have gone toward anticipating and exceeding their demands.

What the Shipper Wants

What the Railroads Plan to Do in Freight Service

What the Railroads Did in 1945

Industrial and Agricultural Developments

Motive Power Appraisal

Freight Car Conditions—Present and Future

The Future of Railway Buying

Railroads' Plans for Construction and Maintenance

Signaling and Train Communication

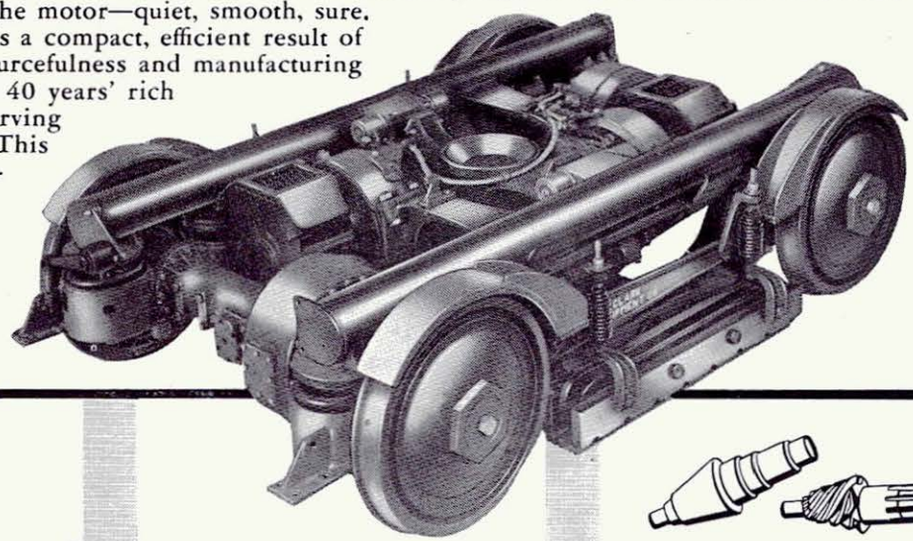
Improved Freight House Operations

Loss and Damage Prevention

Reserve Your Space Now!

COMFORT undreamed of . . .

THERE'S NO PLEASANTER FORETASTE of the delightful comforts Transportation has in store than a ride on Clark Street Car Trucks. Hypoid gears are silent. Wheels are rubber cushioned—unbelievably smooth, noiseless. Springs are soft, comfortable. Brakes are mounted on the motor—quiet, smooth, sure. . . . Here, truly, is a compact, efficient result of engineering resourcefulness and manufacturing "know how", of 40 years' rich experience in serving Transportation. This is the kind of creative usefulness Industry expects of the Men of Clark.



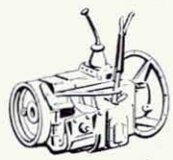
FORK TRUCKS AND INDUSTRIAL TRACTORS

STREET RAILWAY CAR TRUCKS

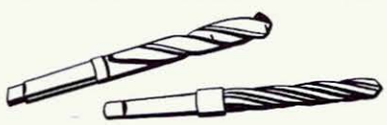
GEARS AND FORGINGS

One piece, forged, heat treated AXLE HOUSING

ELECTRIC STEEL CASTINGS



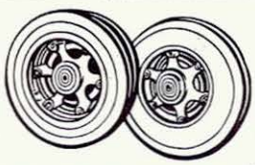
TRANSMISSIONS for Trucks, Busses, Tractors



CELFOR HIGH-SPEED DRILLS AND REAMERS

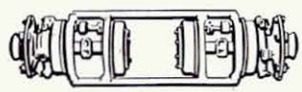
POWER BOOSTER for 1½-ton Trucks

BLIND RIVETING PROCESS



METAL SPOKE-TYPE WHEELS for Trucks, Busses, Trailers

AXLES—front and rear for Trucks, Busses, Tractors

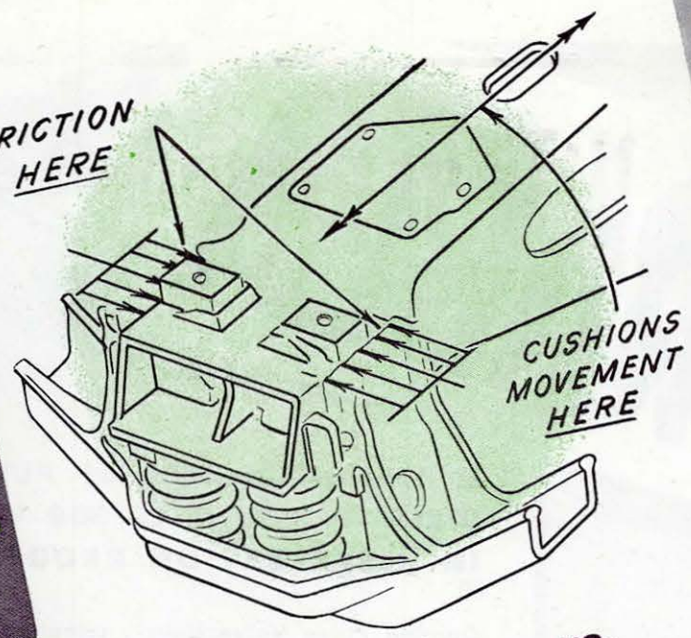


EASY-ROLL TRAILER AXLE

CLARK EQUIPMENT COMPANY

RAILWAY DIVISION - - - BATTLE CREEK, MICHIGAN

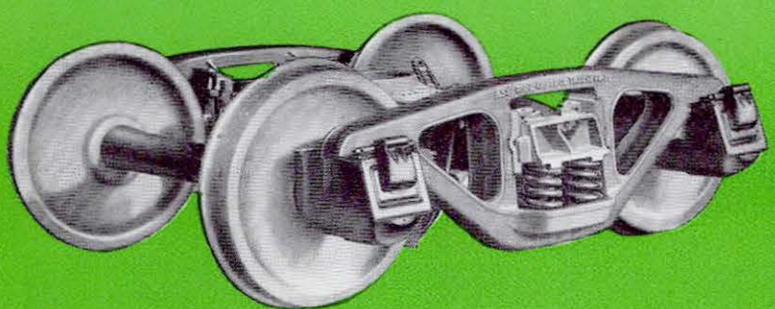
GIVES LADING AN EASY RIDE



THE SAME CONSTANT FRICTION THAT CONTROLS UP-AND-DOWN MOTION ALSO CUSHIONS LATERAL BOLSTER MOVEMENT IN EASY-RIDING A.S.F. RIDE-CONTROL TRUCKS. RESISTANCE OF THE TRUCK COIL SPRINGS ALSO HELPS CHECK ACROSS-THE-TRACK MOVEMENT, AND RESTORES THE BOLSTER TO NORMAL POSITION WHEN LATERAL FORCE IS RELIEVED. A.S.F. RIDE CONTROL IS RIDE CONTROL!

Over 19,000 sets of this modern freight car truck are already in service or on order by 48 railroads or private car owners.

MINT-MARK OF ● FINE CAST STEEL



A·S·F *Ride-Control* TRUCK (A·3)

NO SPRING PLATES—NO SPRING PLANKS

LONG SPRING TRAVEL · CONSTANT FRICTION CONTROL

AMERICAN STEEL FOUNDRIES

CHICAGO

11 STANDARD SIZES OF PUMP VALVE UNITS TO MEET OVER 300 VARIATIONS IN INSTALLATION REQUIREMENTS.

Durabla Pump Valve Units*, complete for any type of pump installation, under any conditions and in any position, are available in 11 standard sizes to assure economy, accuracy, and avoidance of delay in stocking and installation:—

1. Minimum stock to meet all requirements. Stock units can be supplied rough cast on the outside seat dimension for machining to exact size.
2. Fewer orders necessary.
3. Ease of ordering because of minimum of detailed information needed.
4. Stock can be kept on hand for emergency breakdown requirements.
5. Your own machine shop can be used for fitting and immediate installation of these valves.
6. Durabla Pump Valve Units are complete, ready to be fitted to any pump.

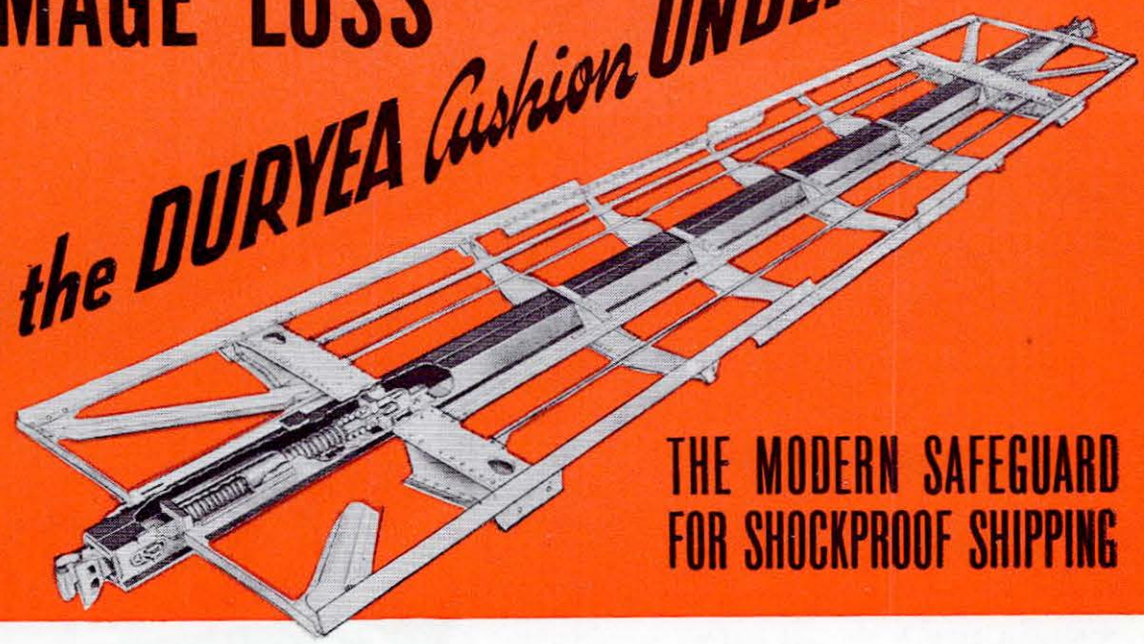
Durabla Standardization has reduced your purchasing and stock problem from over 300 sizes to 11 standard pump valve units. This means time saved in purchasing; simplicity of installation; together with efficiency and long term economy.

Address DURABLA Engineering Department for Information and Bulletin 6A3

*Patent Numbers 2090486, 2117504

DURABLA MANUFACTURING COMPANY
114 LIBERTY ST. NEW YORK
BRANCHES IN PRINCIPAL CITIES. FOR CANADA REFER: CANADIAN DURABLA LIMITED, TORONTO

Reduce DAMAGE LOSS with the DURYEA *Cushion* UNDERFRAME



THE MODERN SAFEGUARD FOR SHOCKPROOF SHIPPING

A.A.R. figures show that damage claims due to rough handling primarily from excessive shocks are steadily increasing. In 1944 damage claims from rough handling alone amounted to over $38,000,000, which was nearly 40% higher than in 1943.

Railroads are greatly concerned over this unprecedented drain on their income account. Shippers and receivers alike are also seeking ways to prevent this profitless and troublesome situation.

A solution to the problem lies in a wider use of cars equipped with the Duryea Cushion Underframe.

The performance record of nearly 62,000 cars shockproofed with the Duryea Cushion Underframe furnishes ample evidence that unusual economies are accomplished through the reduction of maintenance costs, prevention of damage claims, and increased availability of equipment.

How the DURYEA *Cushion* UNDERFRAME Contributes to Railroad Operation Economies

PROTECTS car and lading, prolongs car life, cuts damage claims.

PERMITS higher handling speeds.

AVOIDS DELAYS AND TIEUPS occasioned by gear replacements, maintaining efficiency for life of car.

SAVES MONEY usually spent for maintenance on every part of car. Keeps cars off cripple track — keeps them rolling.

SAVES TIME loading and unloading. Needs less packing and bracing.

CUTS SLACK to predetermined ideal.

CREATES greater shipper goodwill.

O. C. DURYEA CORPORATION

30 Rockefeller Plaza, N. Y. 20, N. Y.
135 S. LaSalle St., Chicago 3, Ill.
1601 Mercantile Trust Bldg., Baltimore 2, Md.

GRASS★ is your Real Problem...

★ *Noxious grass is the real problem in maintaining weed-free track . . . kill it successfully, and weeds automatically fall by the wayside.*

HERE'S HOW: Use double-duty Bysulox treatment! With it *two* powerful chemicals—Bysulox A and Bysulox C—are applied simultaneously in combination with water . . . automatically . . . uniformly. Bysulox A quickly destroys surface fibres, kills tops, and makes leaves and stems porous, absorbent and subject to quick decay. Bysulox C—having a toxic oil base—produces chronic sterility of the soil, waterproofs the treatment against leaching, and suppresses regrowth and seeds.

Properly planned applications of these unique new compounds successfully control noxious grasses such as Horsetail, Quack Grass, Johnson and Bermuda Grass!

OUTSTANDING HAZARD RECORD, TOO! Not one case of livestock poisoning has ever been reported, and thousands of miles of track have been treated with these Bysulox chemical compounds over a three-year period.

"CUSTOM PLANNED" SERVICE: General Chemical Weed Killer Division develops control programs which are individually planned for areas to be treated, basing recommendations on thorough track inspection with regional and divisional statistical cost analyses.

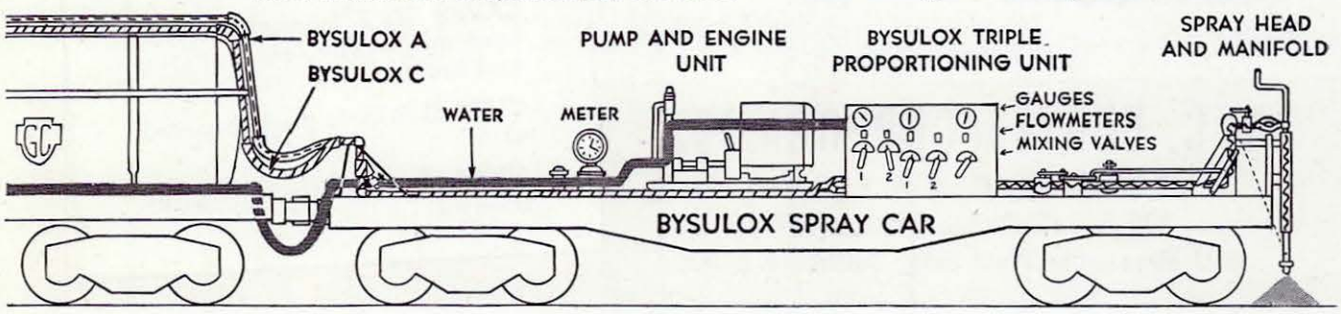
Get the grasses in '46; use Bysulox. For consultation and "custom planned" service, write—

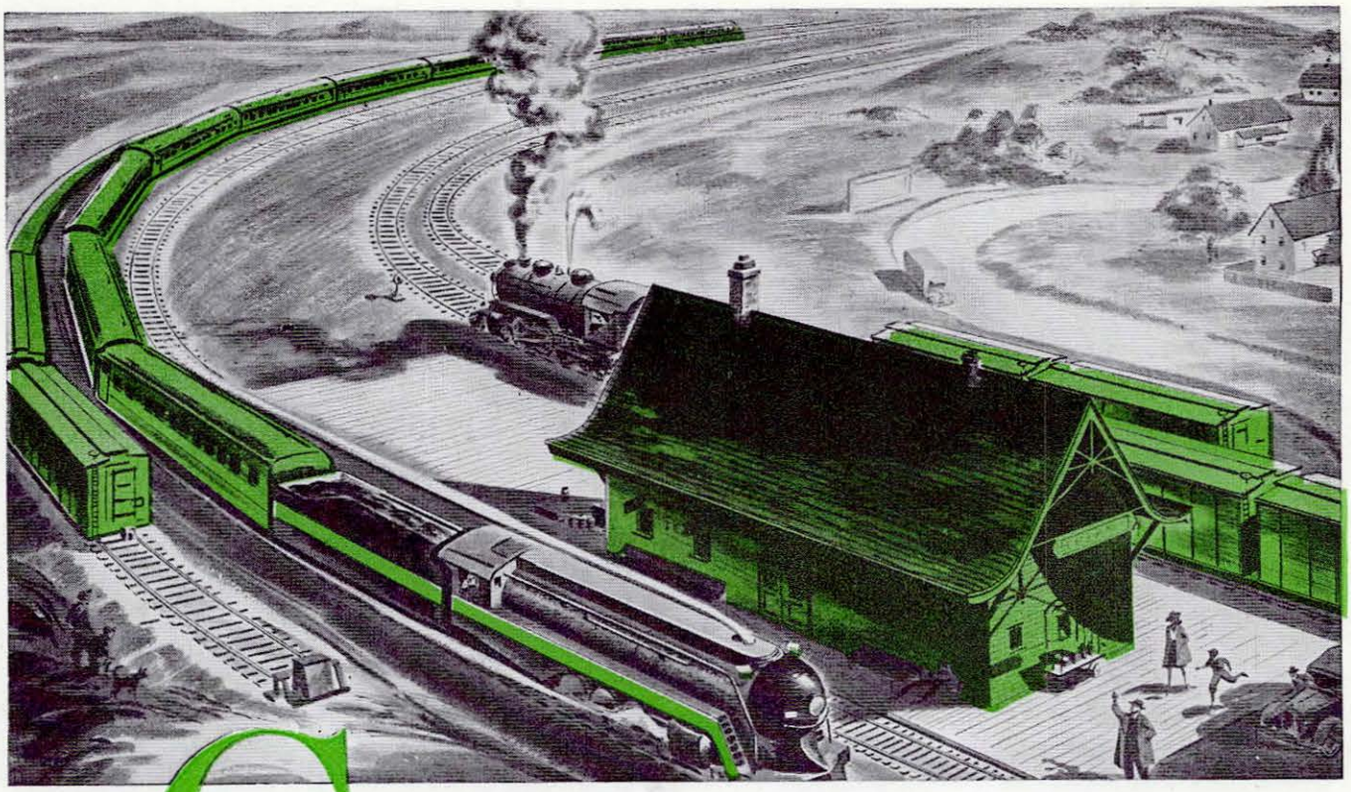
GENERAL CHEMICAL COMPANY
Weed Killer Division
40 RECTOR STREET, NEW YORK 6, N. Y.

†Reg. U. S. Pat. Off.

ADVANCED APPLICATION METHODS

General Chemical's Railroad Service provides the most advanced type of spray train operated by skilled supervisors (See Photo Above). With it, no mixing of chemicals at water towers is necessary; work crews are held to a minimum. Sketch below shows detail of Bysulox Spray Car. Here, Bysulox A and Bysulox C are transferred by air pressure from tank cars, and automatically and continuously mixed with water in a triple proportioning unit. Combined spray may be changed instantly in proportion or quantity, according to nature and type of weed growth encountered.





COLOR *can do things*
FOR YOUR RAILROAD

People respond to color. Rightly used color affords railroads a real opportunity to build good will. On locomotives, passenger cars and stations, color can give people a sense of comfort, relaxation and security. On freight cars it suggests efficiency and good management.

But the use of color should not be left to whim or fancy for it is both an art and a science.

The Glidden Company took the lead in recognizing the importance of color in industry by establishing the first paint color laboratory back in 1930. Since then Glidden color engineers have made many outstanding contributions to the scientific utilization of color.

Glidden has been working with America's railroads on paint problems for a good many years.

Now we offer you a complete color service by industry's greatest color strategists.

We would welcome the opportunity of studying your requirements and submitting a recommendation without obligation to you. Just drop us a line.

THE SYMBOL OF COLOR AUTHORITY

THE GLIDDEN COMPANY • Cleveland 2, Ohio

Glidden
Pacemaker in Paints

CLEAR THE TRACK

with Fuller Fiber Railroad Track and Snow Brooms

Ruggedly built for cleaning tracks and switches. Made of best fiber obtainable. Tough and rugged enough to hold its shape and wear down evenly under punishing conditions. Adopted by many large railroad systems as standard. Also available with chisel end for removing ice and frozen sand from clogged switches.

Other Fiber Brooms for warehouses, cars, cabs and platforms. Send for complete catalog.

For Fuller Satisfaction

Floor Brushes	Wet Mops
Scrub Brushes	Dry Dusting Mops
Dust Brushes	Fiber Brooms

Wax and Polish

Send for Catalog **TO DEPT. 94**

THE FULLER BRUSH CO.

INDUSTRIAL DIVISION

HARTFORD 2, CONNECTICUT

MAGOR

Designers and Manufacturers of Freight Cars of all Types Including Air Dump Cars

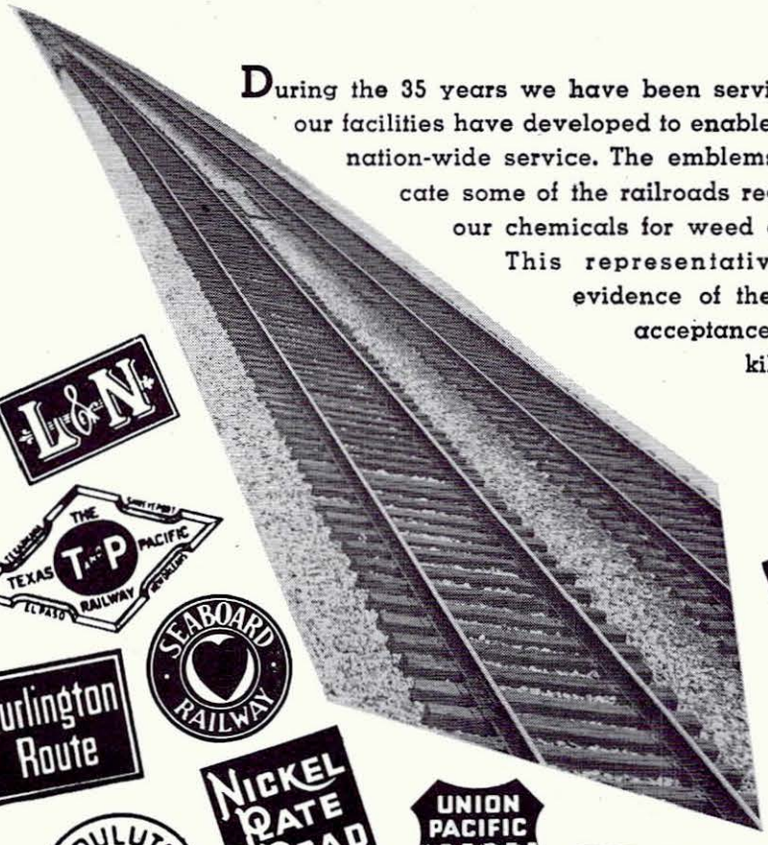
Magor Freight Cars are consistent revenue producers. Special attention to details in design and skillful workmanship assure carriers of long life dependable freight equipment. Magor facilities are capable of producing all types of freight cars of modern construction. Let us bid on your requirements.

MAGOR CAR CORPORATION

50 Church Street

New York 7, N. Y.

Let's take a Look at the Record –



During the 35 years we have been serving railroads, our facilities have developed to enable us to render nation-wide service. The emblems below indicate some of the railroads regularly using our chemicals for weed control work. This representative group is evidence of the widespread acceptance of our weed killer products.

Sprayed with

ATLACIDE CHLORATE WEED KILLER *and* **ATLAS "A"** ARSENICAL

CHIPMAN CHEMICAL COMPANY, INC.

Chicago, Ill. BOUND BROOK, N. J. Houston, Tex.
Palo Alto, Calif. No. Kansas City, Mo. Portland, Ore.

Over Thirty-five Years of Weed Control Service

. . . not a weak sister in the whole line. Take their Car Cements and Protective Coatings, for instance. We've been shorthanded here . . . had to skip a few shoppings, but even so there isn't a sign of peeling or rusting on any of those gondolas where Flintkote Coatings were used.

And look at that signal tower. Trains have been blowing smoke and cinders at it 24 hours a day for two years, but I couldn't find a bare metal spot on it anywhere. These modern Flintkote industrial asphalts sure can take it.

* * *

Flintkote offers a wide range of Railroad Products for the protection and restoration of railway structures and rolling stock, as well as Flooring Emulsions for heavy-duty mastic floors . . . adhesives . . . insulation coatings . . . pipe and cable coatings . . . non-slip floor surfacing . . . waterproofing and dampproofing specialties . . . and a complete line of building materials.

Field engineers, backed by Flintkote's 45 years of experience, will be glad to help you determine the most efficient solution to any problem involving these materials and applications.

Send for "Modern Asphalt for Railroads" and get the whole story on these Flintkote products for maintenance and new construction.

Flintkote-Products for Industry

THE FLINTKOTE COMPANY · **INDUSTRIAL PRODUCTS DIVISION**

ATLANTA · BOSTON · CHICAGO HEIGHTS · DETROIT · LOS ANGELES

FLINTKOTE INDUSTRIAL PRODUCTS

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

NEW ORLEANS · WASHINGTON · TORONTO · MONTREAL

Good Companions

. . . *on New Passenger Cars*

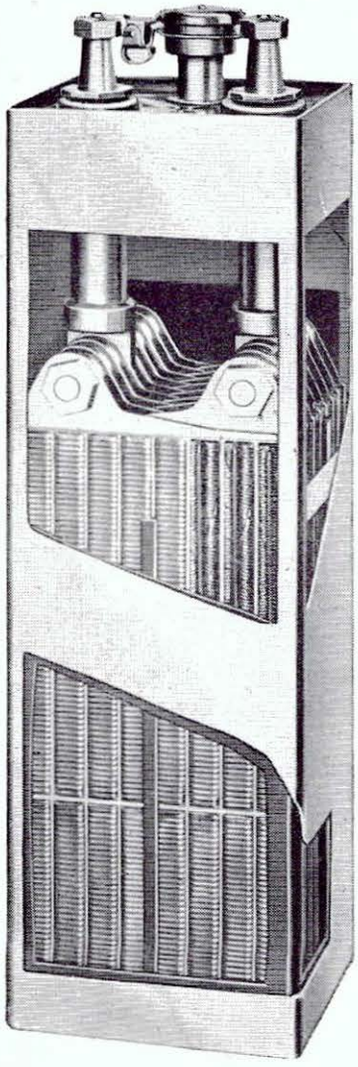
1. Ultimate comfort

2. Light weight

3. Alkaline batteries

Ample refrigerating capacity for air conditioning, high standards of illumination, radios, motion pictures, and many of the other features now being planned for passenger comfort will function from the electrical power supply of the car.

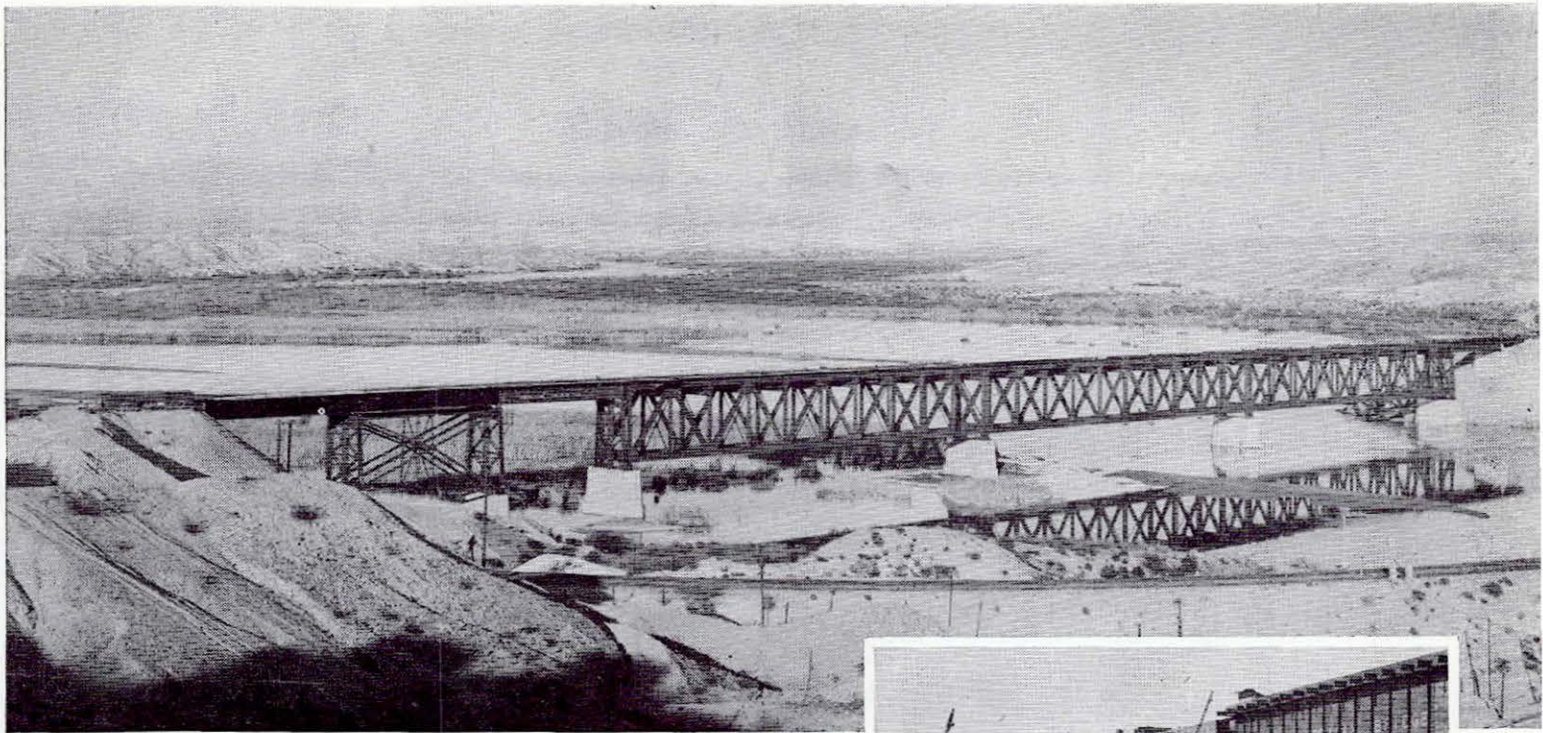
The trend will very probably be toward more of these features, higher electrical loads, and batteries of higher capacity. If so, batteries will be needed that provide increased capacity with the least additional weight and with the greatest inherent dependability of operation. All of these requirements are met by Edison Alkaline Batteries. *Edison Storage Battery Division of Thomas A. Edison, Inc., West Orange, N. J.*



Steel cell construction is an important reason for the durability and light weight of Edison Alkaline Batteries.

Edison

THE LIGHTWEIGHT BATTERY FOR LIGHTWEIGHT CARS



SANTA FE's new, high-level Topock Bridge replaces an old through-truss cantilever crossing of the Colorado River. The old bridge (not shown) is located at the extreme right end of the curving alignment of the low-level roadbed in the foreground. The new, ballasted-deck structure consists of three, 350-foot deck truss spans over the main channel with plate girder approaches to the east and west, respectively 150 and 300 feet long. The steel superstructure was fabricated and erected by American Bridge Company.

IMPRESSIVE ENGINEERING FEAT... *removes a "bottleneck"*

THE new Colorado River Crossing of the Atchison, Topeka and Santa Fe near Topock, Arizona, is one of the outstanding bridge construction projects of recent years. This modern, double-track bridge, replacing a 55-year old single-track structure, now speeds vital traffic to California's ports of war.

Built in the days of lighter rolling stock and slower speeds, the "old-timer" was twice reinforced to meet progressive increases in loadings. But this single-track link in an otherwise double-tracked line, formed a "bottleneck" on a railroad which handles an important share of the record burden of transcontinental wartime traffic.

The new Topock Bridge eliminates the "bottleneck." Its design and construction embody engineering developments that contribute to permanence and to the strength and ruggedness necessary to meet today's and tomorrow's heavy power, traffic density and high speed operations. It is the major element of a greatly improved roadbed alignment which reduces by some 327 degrees in central angle the amount of total curvature inherent in the older line.

The developments and accomplishments of wartime "railroading" will be influencing factors of postwar competition. And transportation projects such as this Topock Bridge point the way to the coming job of roadbed rehabilitation. When the railroads' postwar jobs shape up, American Bridge will be prepared with vastly greater resources and experience, to meet their every structural need.

AMERICAN BRIDGE COMPANY

General Offices: Frick Building, Pittsburgh, Pa.

District Offices in: Baltimore · Boston · Chicago · Cincinnati · Cleveland · Denver · Detroit
Duluth · Minneapolis · New York · Philadelphia · St. Louis

Columbia Steel Company, San Francisco, *Pacific Coast Distributors* United States Steel Export Company, New York

UNITED STATES STEEL

"TO ATTAIN STILL HIGHER STANDARDS OF SERVICE..."

"An asset in which the Nickel Plate Road takes great pride is the high standard of service which it renders to the shipping public. With its record for outstanding performance during the war years back of it, the Nickel Plate is looking forward to the utilization of new technological developments, such as radio and teletype, in order to attain still higher standards of service and usefulness."

President,
The New York, Chicago & St. Louis R.R. Co.

To fulfill completely its promise of increased rail efficiency, railroad radio equipment must be so designed that individual system units, such as transmitters, receivers, power supplies, and remote control units, will be readily accessible for inspection and quickly removable for service, replacement, or relocation.

Realizing the importance of these requirements, the Farnsworth Mobile Communications Division has engineered its railway communications equipment on the bases of *standardized design* and *unitized construction.*

Practical results from the application of these two engineering principles include the facts that—

(1) The basic components of Farnsworth systems, whether of space-radiating or inductive type, are *separate units,* which can be *quickly disassociated* from a system, either for maintenance or relocation.

(2) The same receiver, transmitter, or remote control unit is usable for wayside, mobile, or relay installations, thus providing *complete interchangeability* of basic equipment throughout any Farnsworth communications system.

(3) *Space-radio and inductive type* Farnsworth *units can be interchanged,* whether a part of mobile or stationary installations, and can be *readily utilized in combination* to meet varying railway operating conditions and requirements.

These are a few of the many engineering features incorporated in Farnsworth railway communications equipments to guarantee *maximum availability and flexibility with simplified, low-cost maintenance.* Farnsworth Television & Radio Corporation, Dept. RA-3, Fort Wayne 1, Indiana.

FARNSWORTH TELEVISION & RADIO CORPORATION

Farnsworth Radio and Television Receivers and Transmitters • Aircraft Radio Equipment • Farnsworth Television Tubes • Halstead Mobile Communications and Traffic Control Systems for Rail and Highway • the Farnsworth Phonograph-Radio • the Capehart • the Panamuse by Capehart

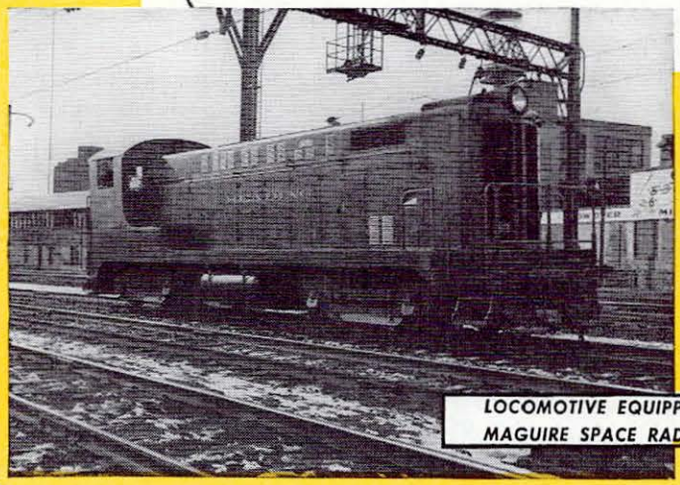
MAGUIRE CUSTOM-ENGINEERED RAILROAD RADIO —

REMOTE STATION

This new complete V. H. F. system of yard communication has definitely proven its value in actual twenty-four hour tests conducted over the lines of the Reading Railroad.

In conducting these tests, five diesel electric locomotives were tied-in, by means of two-way radio telephone equipment, with a fixed station located in the yardmaster's office. This fixed station, equipped with automatic voice recorder, is connected by telephone circuits with two remote stations, which are, in turn, able to contact the locomotives via this equipment.

For more detailed information on this new-type equipment write to Maguire Industries, Electronics Division at the address below.



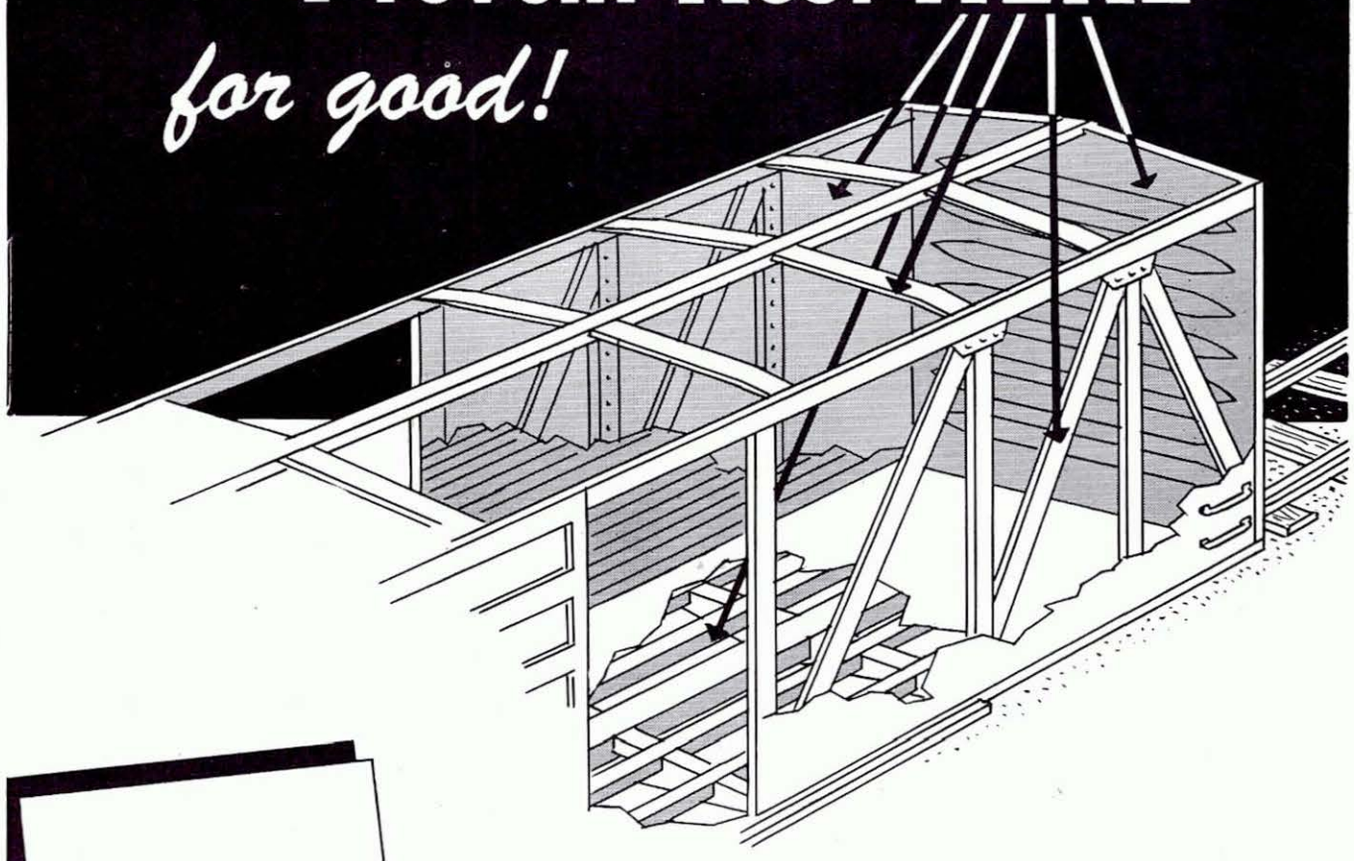
LOCOMOTIVE EQUIPPED WITH MAGUIRE SPACE RADIO

ELECTRONICS DIVISION

MAGUIRE INDUSTRIES, INCORPORATED

1437 RAILROAD AVENUE • BRIDGEPORT, CONN.

Prevent Rust HERE *for good!*



Check These Features:

- Apply directly over any rusted surface
- Simply wire brush to remove loose scale, blisters and dirt
- Rust-Oleum penetrates the remaining rust and spreads an unbroken protective coating over the entire surface
- Excellent coverage. Gallons of economy
- It's easy to apply by brush, dip or spray...Saves time, labor, and money

RUST-OLEUM

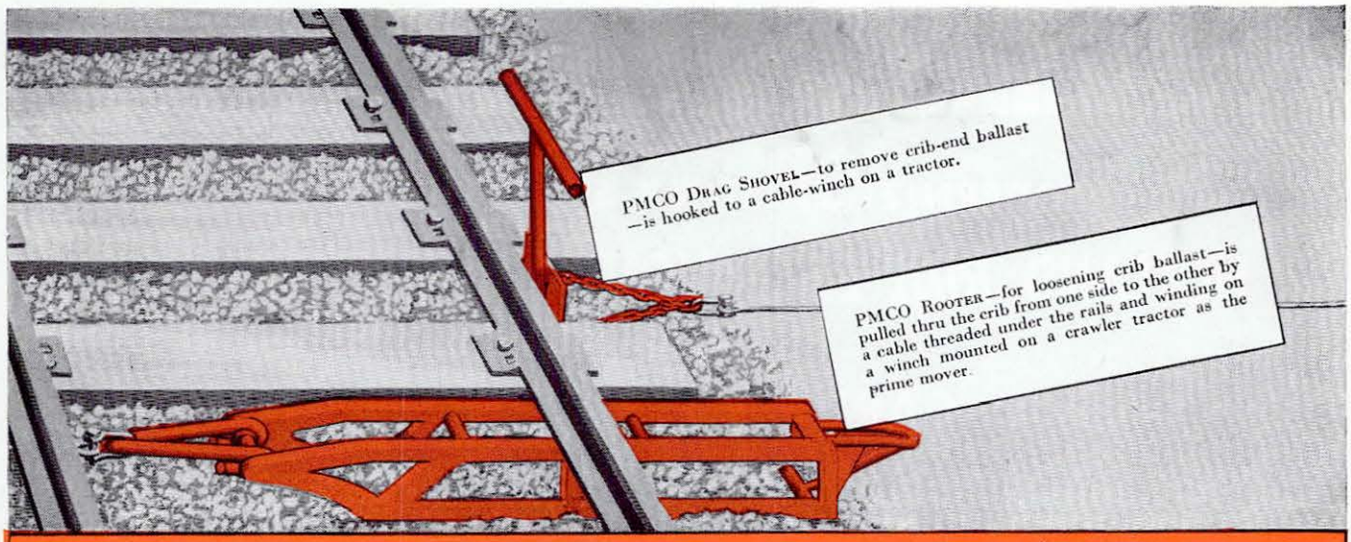
Provides Lasting Protection

When rust attacks the hidden metal surfaces of rolling stock, look out! You're in for another costly, time consuming rebuilding job. Yet those inner surfaces—the areas between inside and outside sheathing are particularly subject to rust caused by condensation and the corrosive effect of acids, brine, sulfur, and other hazards commonly encountered in railroad operations.

On your next car rebuilding job, *stop rust once and for all.* Coat those inner metal surfaces with RUST-OLEUM, the scientific, pure rust preventive. This remarkable product effectively prevents the formation of rust—penetrates through to virgin metal and spreads protective coating over the entire surface. And this protection LASTS FOR YEARS, as proved conclusively in practical tests.

Rust-Oleum does not blister, crack or peel. It is air-tight, waterproof, pliable and elastic. For years it has cut car maintenance costs for American Railroads. *Write today for Catalog No. 145 for recommended applications.*

RUST-OLEUM CORPORATION
2415 OAKTON STREET • EVANSTON, ILLINOIS


PMCO Drag Shovel—to remove crib-end ballast —is hooked to a cable-winch on a tractor.
PMCO Rooter—for loosening crib ballast—is pulled thru the crib from one side to the other by a cable threaded under the rails and winding on a winch mounted on a crawler tractor as the prime mover.

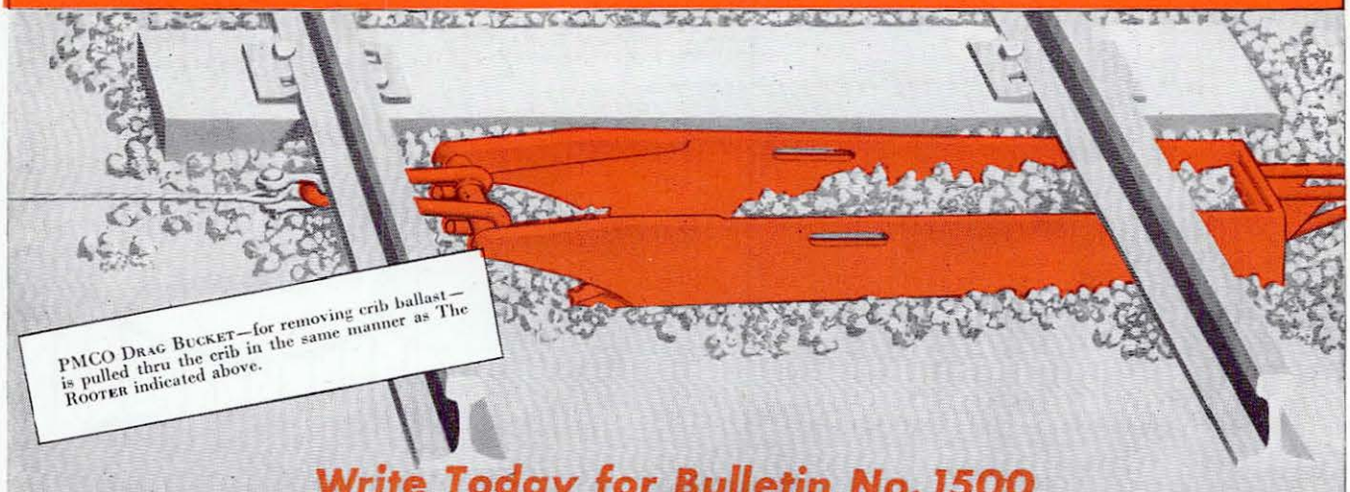
APPLY MODERN EARTH MOVING METHODS IN SKELETONIZING TRACK

The New PETTIBONE MULLIKEN CRIBBING SET

ROOTER • DRAG BUCKET • DRAG SHOVEL

Saves $1,000 *per mile*
$100,000 *per* 100 *miles*

Eliminates (pick and shovel) hand methods
Eliminates monotony and drudgery of hand cribbing
Maintains satisfied crews
Speeds up skeletonizing 500%



Write Today for Bulletin No. 1500

"Quality Since 1880"

PETTIBONE MULLIKEN CORPORATION

4710 West Division Street, Chicago 51, Illinois

MODERNIZE EXISTING EQUIPMENT WITH

HOLLAND *RIDE-EASE* VOLUTE TRUCK SPRINGS

STYLE B-190

LOAD CARRYING *PLUS* SNUBBING

LONG TRAVEL

2¾ INCHES

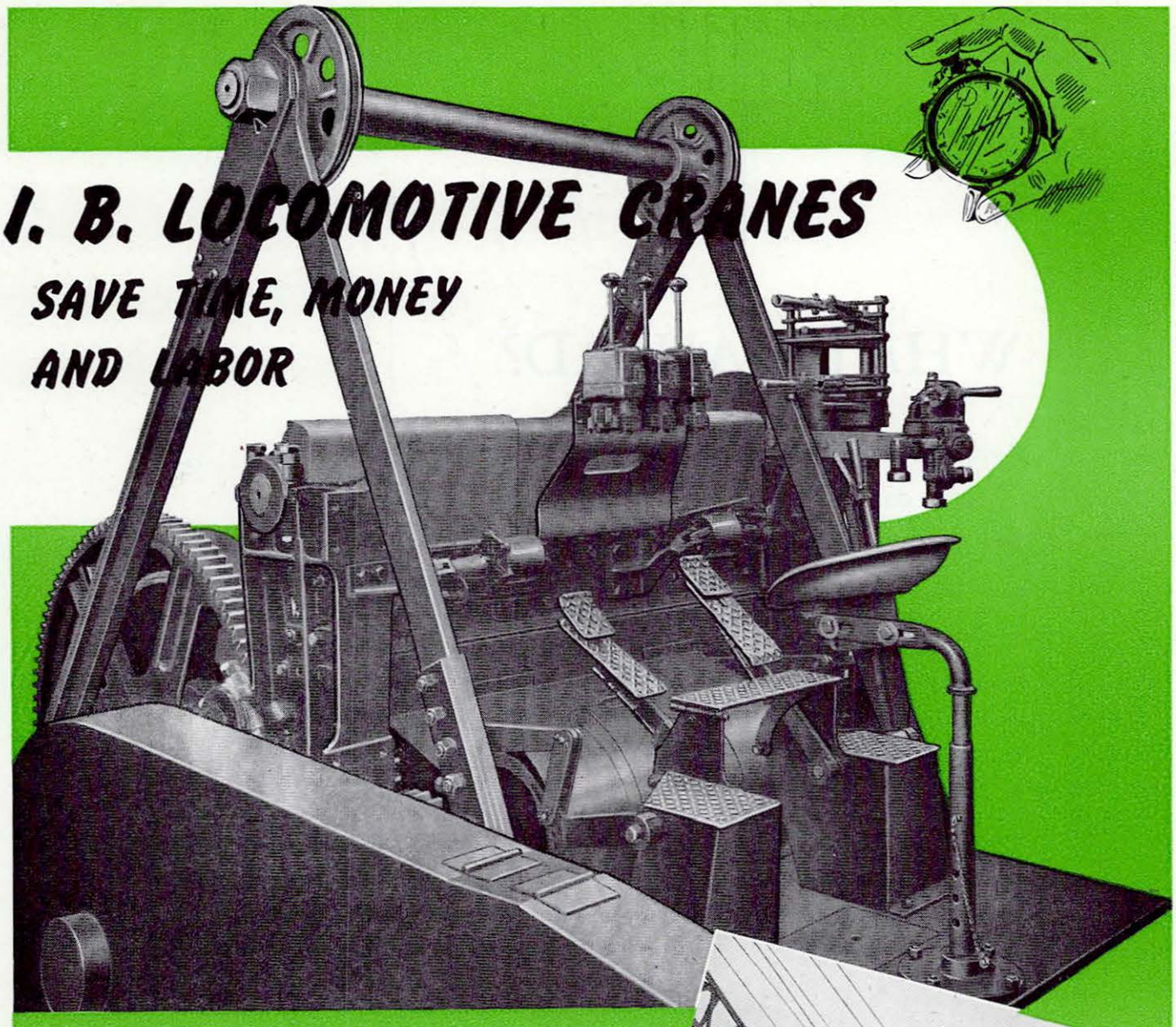
COMBINATION LOAD CARRYING AND SNUBBING

332 S. MICHIGAN AVE. HOLLAND COMPANY CHICAGO 4, ILLINOIS

1651

I. B. LOCOMOTIVE CRANES

SAVE TIME, MONEY AND LABOR

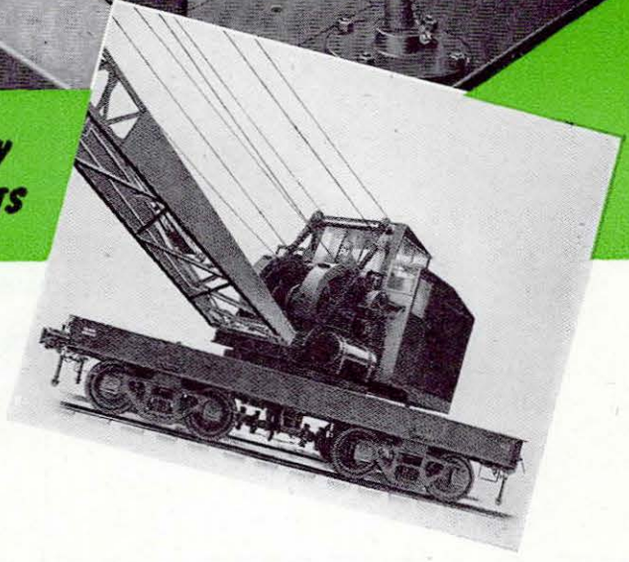


IMPROVED CAB AND CONTROLS SIMPLIFY CRANE OPERATION—CUT HANDLING COSTS

Well engineered, ruggedly built Industrial Brownhoist Locomotive Cranes embody all of the latest, most modern developments.

All air and manual controls are within quick, easy reach of the operator, thus minimizing physical effort.

Air controls, anti-friction bearings, one piece steel bed and 360° vision from Monitor-type cab assure faster, more economical, safer operation and greater dependability under constant handling of heavy loads with magnet, hook or bucket. Write for complete particulars.



Greater efficiency, greater dependability are engineered into I.B. Locomotive Cranes.

INDUSTRIAL BROWNHOIST BUILDS BETTER CRANES

INDUSTRIAL BROWNHOIST CORP. • BAY CITY, MICH. • District Offices: New York, Philadelphia, Cleveland, Chicago • Agencies: Detroit, Birmingham, Houston, Denver, Los Angeles, San Francisco, Seattle, Vancouver, B.C., Winnipeg, Canadian Brownhoist Ltd., Montreal, Quebec

WHAT'S AHEAD?

Railroad transportation as never before . . . new comforts . . . new conveniences. Travel bans, crowding and discomforts give way to the new era. The habit of *"going by train"* will grow as new travel comforts and conveniences are provided.

OUR PART. . . . . .

Building complete car lighting systems and air conditioning equipment to supply the public, thru you, with the comfort and convenience needed. Safety Company 'know-how' in engineering and manufacturing is shown in 60 years of pioneering new developments for improvements to railroad service.

THE SAFETY CAR HEATING AND LIGHTING COMPANY INC.

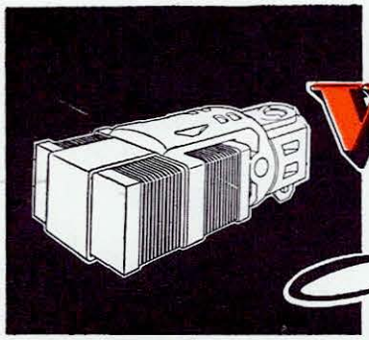
NEW YORK • CHICAGO • PHILADELPHIA • ST. LOUIS • BOSTON • SAN FRANCISCO • MONTREAL

"I have never had such a pleasant ride! No Jolts! No Jars!"

PROGRESSIVE AMERICAN RAILROADS
equipping their newest and finest passenger cars with Waughmat Twin Cushions:

New York Central
Pennsylvania
Pullman Company
Erie
Union Pacific
Missouri Pacific
Atlantic Coast Line
Southern Pacific
Burlington
North Western
Louisville & Nashville
New Haven
Texas & Pacific
Pere Marquette
Northern Pacific
Great Northern
Seaboard
St. Louis-San Francisco
Chicago & Eastern Illinois
Norfolk & Western
Wabash
Illinois Central
Gulf, Mobile & Ohio
Western Pacific
Canadian Pacific
Rock Island
Boston & Maine
Maine Central
Rio Grande

MODERNIZE with



WAUGHMAT ★ *Twin Cushions*

ELIMINATE JERKS AND JARS

★ CAN BE APPLIED TO OLD OR NEW CARS

WAUGH EQUIPMENT COMPANY, New York · Chicago · St. Louis · Canadian Waugh Equipment Company: Montreal

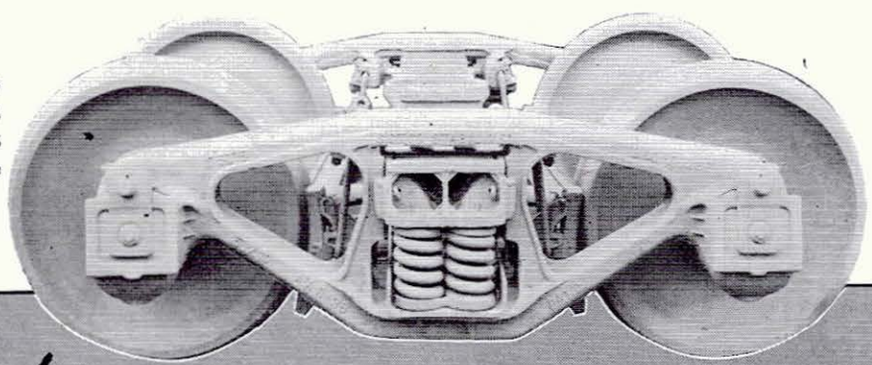
for high speeds or low speeds

Barber Stabilized Trucks
mean smooth riding freight cars

Harmonic bounce, spring breakage, bolster and column wear are things of the past when freight cars roll on Barber Stabilized Trucks. Since the damping effect of these trucks is in proportion to the car load — NOT A FIXED PRESSURE — cars operate smoothly and safely regardless of speed or load conditions.

The truck to specify for better freight car service.

Over 100,000 car sets of BARBER STABILIZED TRUCKS are now in service on 56 different railroads and private car lines.



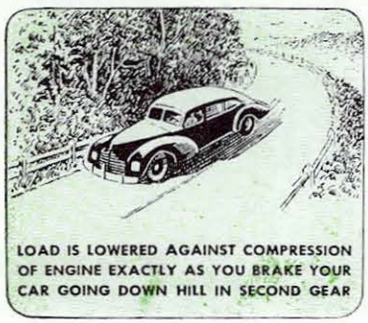
Standard CAR TRUCK COMPANY
332 SOUTH MICHIGAN AVE., CHICAGO 4, ILL.

50 Ton Load!...Operator is SAFE with Orton

COMPRESSION BRAKING

All Orton Diesel Cranes are equipped with a 3-speed *and reverse* transmission, located just behind the engine to control the speeds of *all* operations of the crane. When lowering a *heavy load*, the transmission is put in reverse and the load is lowered against compression of the engine exactly as you brake your car going down hill in second gear.

Just as in your car, the compression of the engine keeps the load from running away, with no possibility of dropping it. Fine control is secured with the friction brake, *which gives fine control only*, and is not relied upon for the safe holding of the load.



LOAD IS LOWERED AGAINST COMPRESSION OF ENGINE EXACTLY AS YOU BRAKE YOUR CAR GOING DOWN HILL IN SECOND GEAR

Compression braking is the Orton invention which made the Diesel crane *practical* for handling heavy loads. *Send for Orton Catalog No. 77 giving detailed description.*

NOW A DIESEL CRANE IS SAFE

ORTON CRANE & SHOVEL CO.

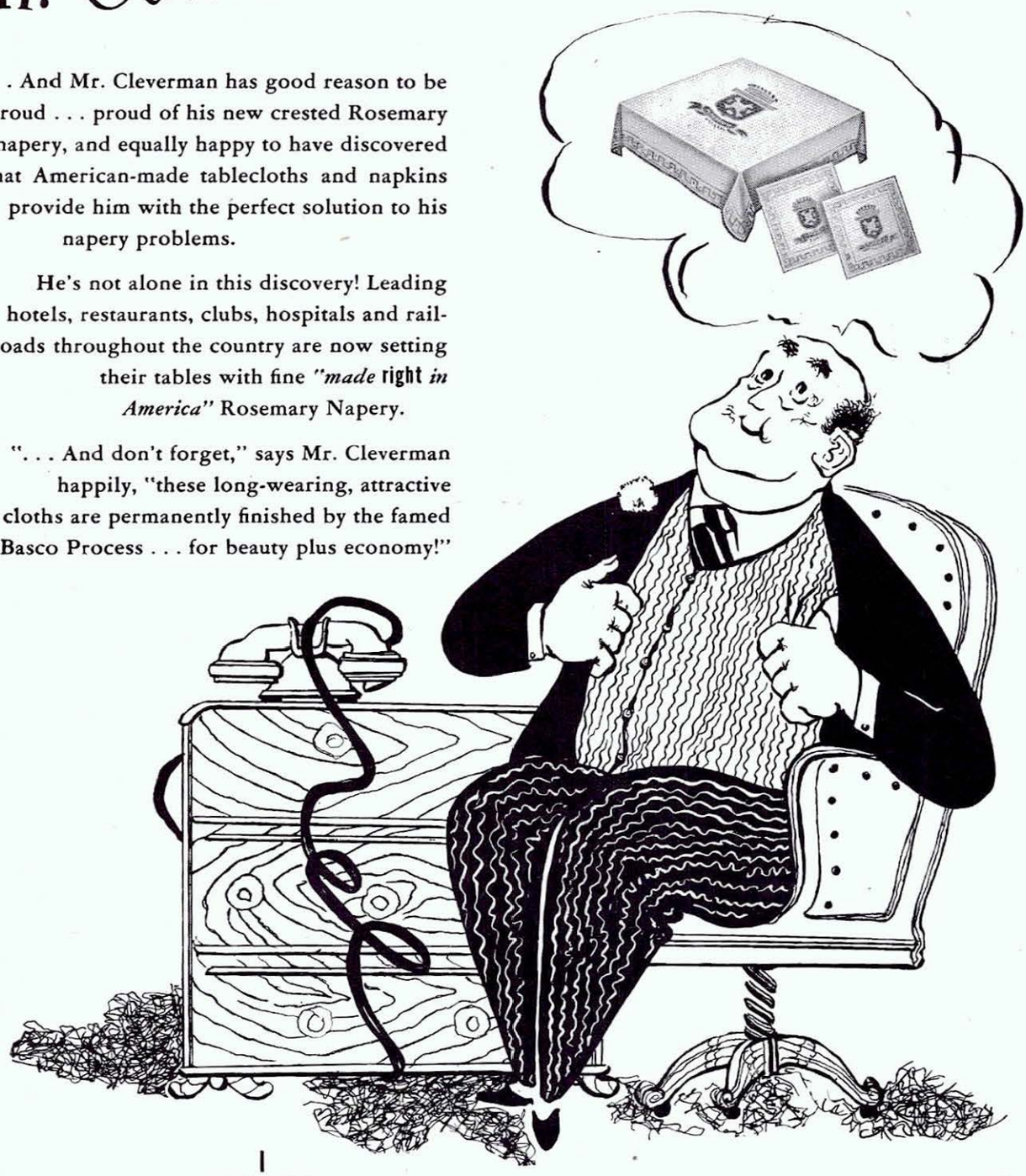
608 SOUTH DEARBORN STREET • CHICAGO 5, ILLINOIS • OFFICES IN PRINCIPAL CITIES

Mr. Cleverman Feels Pretty Chesty!

. . . And Mr. Cleverman has good reason to be proud . . . proud of his new crested Rosemary napery, and equally happy to have discovered that American-made tablecloths and napkins provide him with the perfect solution to his napery problems.

He's not alone in this discovery! Leading hotels, restaurants, clubs, hospitals and railroads throughout the country are now setting their tables with fine *"made right in America"* Rosemary Napery.

". . . And don't forget," says Mr. Cleverman happily, "these long-wearing, attractive cloths are permanently finished by the famed Basco Process . . . for beauty plus economy!"



Rosemary

ROSEMARY SALES

A Division of Simmons Co.

40 Worth St., New York 13, N. Y.

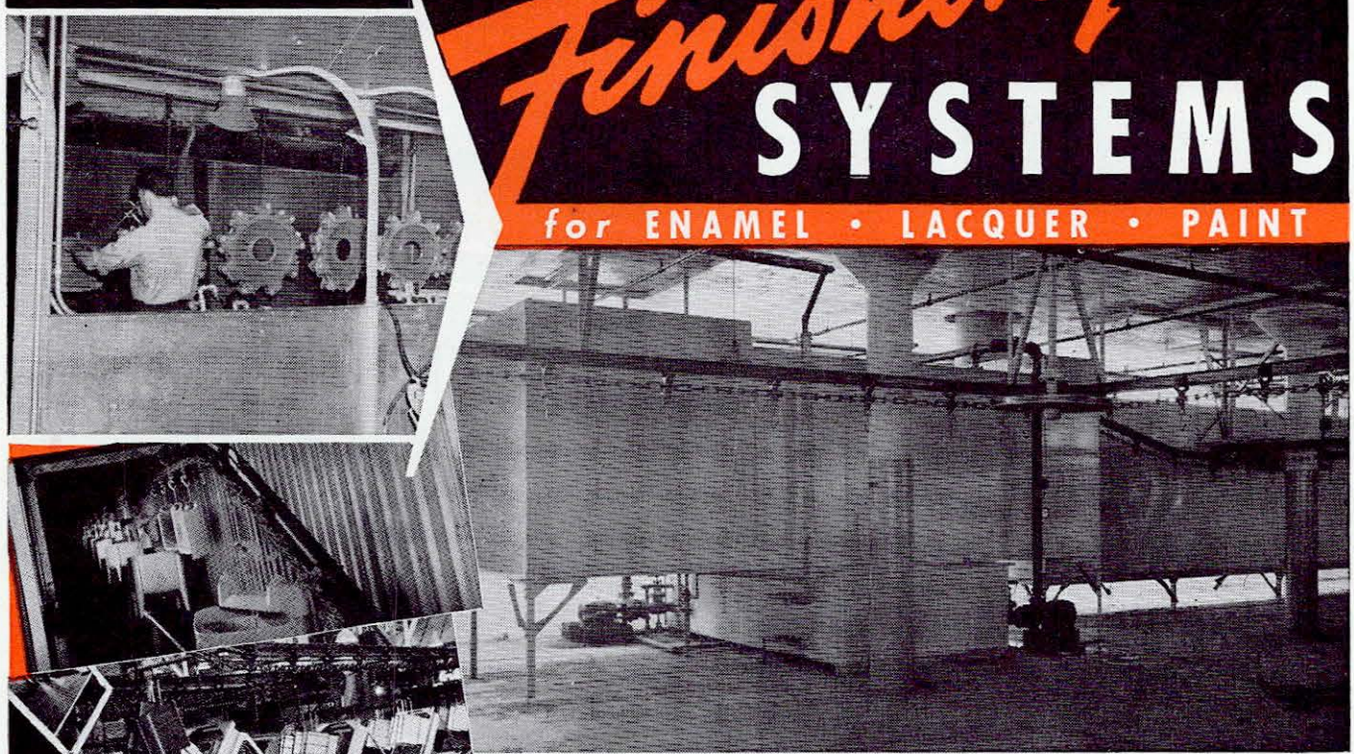
★

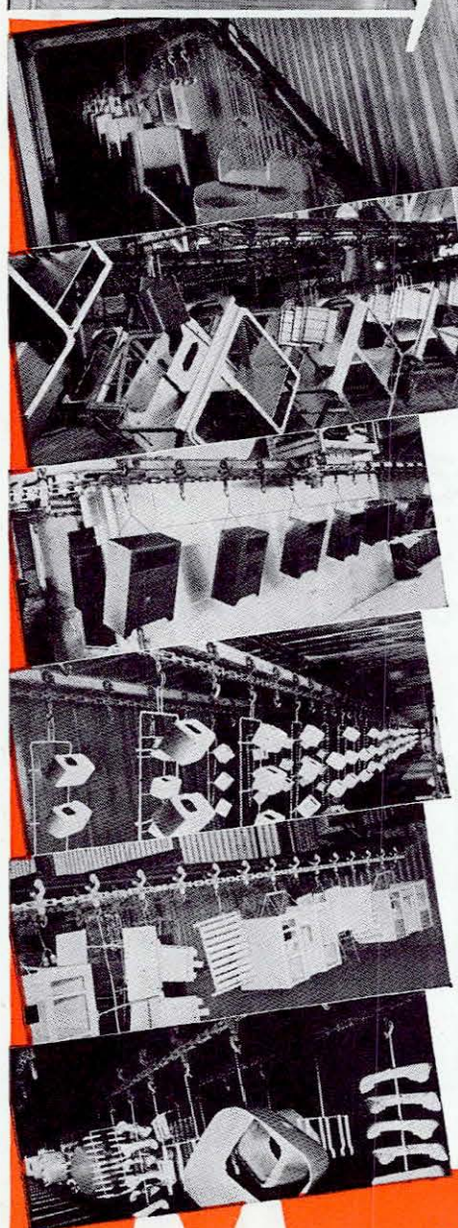
TABLECLOTHS • NAPKINS • TRAY COVERS • DAMASKS

"Napery of the Nation"

COMPLETE *Finishing* SYSTEMS

for ENAMEL • LACQUER • PAINT





. . . planned to meet YOUR Production Requirements, and Engineered to give YOU a better Finish Job at lower Unit Cost

In industries where Finishing constitutes a major production operation, a modern, completely conveyorized Finishing System is essential today—not only from a cost standpoint, but to insure the eye-appeal that makes for saleability in any product. The Mahon organization—pioneer in this field—is prepared to plan, engineer, build and install a complete Finishing System including Metal Cleaning and Rust-Proofing, Drying, Spraying, and final Drying or Baking equipment . . . a complete system properly coordinated to do your particular finishing job with utmost efficiency. If plant space is a problem, it can be installed on the roof or adjacent to present building. Mahon engineers can today point to hundreds of installations all over the world . . . this experience, and their close contact with production experts in every industry, has endowed them with a wealth of technical knowledge and practical know-how not available to you elsewhere. An investment in equipment of this type warrants consideration of these facts . . . consultation with Mahon engineers will not place you under obligation.

Address Correspondence to INDUSTRIAL EQUIPMENT DIVISION

THE R. C. MAHON COMPANY

HOME OFFICE AND PLANT, Detroit 11, Mich. • WESTERN SALES DIVISION, Chicago 4, Ill.

Engineers and Manufacturers of Complete Finishing Systems including: Metal Cleaning Machines, Rust-Proofing Machines, Dry-off Ovens, Hydro-Filter Spray Booths, Filtered Air Supply Units, and Drying and Baking Ovens. Also Paint Sludge Reclaiming Units, patented Hydro-Foam Dust Collecting Systems, and many other Units of Special Production Equipment.

MAHON

Now's the Time to get on a revised COLOR schedule!

WARTIME SCHEDULES which hampered railroad maintenance are rapidly being scrapped. Although today's conditions make it possible to catch up, the job must be done quickly. Rolling stock must continue to move at a swift pace to meet today's needs of demobilization as well as innumerable civilian requirements.

Carhide's ease and speed of application make lengthy layups needless. Freight cars can be refinished with attractive new colors in "around-the-clock" cycles, ready for stenciling, after overnight drying. This finish dries to a glass-smooth, extra durable surface that resists cracking and peeling caused by extremes of temperature and withstands repeated washings and scrubbings.

Other Pittsburgh Railway Finishes include Stationhide for stations; Ironhide for bridges and signal towers, Lavax Synthetic Enamels for passenger cars and locomotives.

Pittsburgh's wide experience in supplying finishes often can save you time and money. Avail yourself of the expert advice offered to users of Pittsburgh's Industrial Finishes.

• • •

PITTSBURGH PLATE GLASS COMPANY, Industrial Paint Division, Pittsburgh, Pa. Factories: Milwaukee, Wis.; Newark, N. J.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Division, Detroit, Mich. The Thresher Varnish Co., Dayton, Ohio.

Why you can Count on Pittsburgh Railway Finishes

1 Quality not just as good—*but better than prewar standards.*
2 Enriched with "*Vitolized Oils*" to keep paint film *live*, tough, elastic—provide long-lasting protection.
3 Many finishes contain oils improved by Molecular-Selection—they're easy to apply, dry quickly, give uniform performance.
4 *Scientifically controlled*—from raw materials to finished product.
5 *Rigidly tested* for durability and uniformity.
6 *Successfully used* by leading railroads.

PITTSBURGH PAINTS

PITTSBURGH PLATE GLASS COMPANY, PITTSBURGH, PA.
RAILWAY FINISHES
PITTSBURGH STANDS FOR QUALITY PAINT AND GLASS

THE *Best* RAILROAD EQUIPMENT OFTEN COSTS THE *Least!*

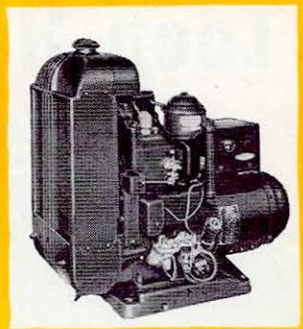
IN handling an unprecedented volume of freight and passenger traffic, one thing stands out clearly in the cost-of-operating and performance records of America's railroads.

Railroad equipment bearing the Fairbanks-Morse name, equipment backed by long engineering experience, skilled craftsmanship standards, and reputation for quality, costs less in the long run.

Remember: for railroad equipment, see Fairbanks-Morse *first.* Fairbanks, Morse & Co., Fairbanks-Morse Bldg., Chicago 5, Illinois.

Fairbanks-Morse Locomotive Water Cranes.

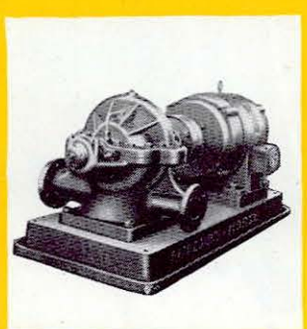
Fairbanks-Morse Motor Cars—"First on the rails and still first."



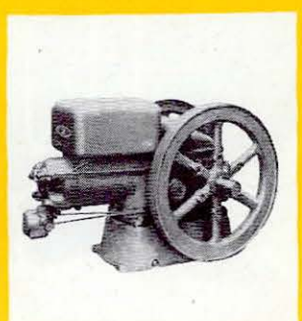
Fairbanks-Morse Generating Sets—One for every requirement.

Fairbanks-Morse Scales—Every type and capacity, including platform scales, pictured.

Fairbanks-Morse Bolted Demountable Hub Motor Car Wheels—For all requirements.



Fairbanks-Morse Pumps—A full line of complete pumping units. Fairbanks-Morse Motors for every need.



Fairbanks-Morse "Z" Engines—Simple, sturdy, single-cylinder engines, in a range of sizes from 2 hp. to 28 hp.

Fairbanks-Morse

A name worth remembering

Diesel Locomotives • Diesel Engines
Scales • Motors • Pumps • Generators
Magnetos • Stokers • Railroad Motor Cars and Standpipes • Farm Equipment

AN UNBEATABLE COMBINATION—

Schaefer

Loop Hangers and Wear Plates

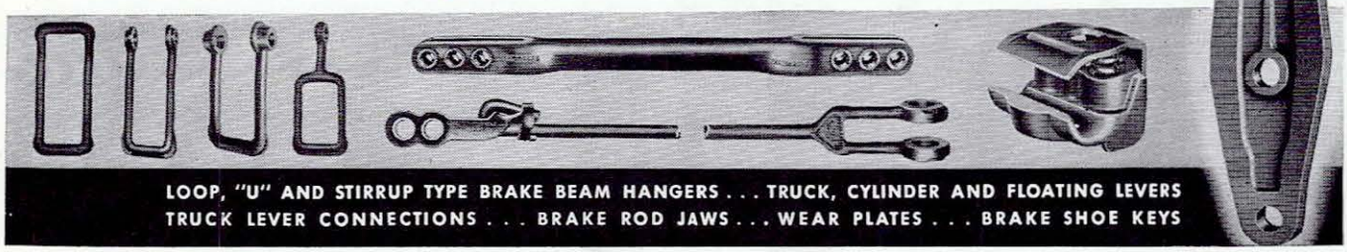
• Just one of many important details that insure long, trouble-free service . . . both the Schaefer Loop Hanger and the supporting Schaefer Ever Tight Wear Plate are oil quenched to exactly the same hardness.

Write for Catalog No. 445

Less Weight Full Strength

Schaefer EQUIPMENT COMPANY

KOPPERS BUILDING • PITTSBURGH, PA.



LOOP, "U" AND STIRRUP TYPE BRAKE BEAM HANGERS . . . TRUCK, CYLINDER AND FLOATING LEVERS
TRUCK LEVER CONNECTIONS . . . BRAKE ROD JAWS . . . WEAR PLATES . . . BRAKE SHOE KEYS

In Recognition of the new conveniences railroads are making available . . . and to point out the important work done by roadbed maintenance crews . . . Allis-Chalmers ran in four colors the advertisement reproduced here in the December 1 issue of the Saturday Evening Post.

Yes, as the new comets of the rails take you where you want to go you will enjoy greater comfort, faster, smoother travel, perhaps even the latest in entertainment.

Record-breaking traffic carried so gallantly and efficiently by the railroads during the war years put a great strain on roadbeds . . . but restoration will not be a slow process. No longer are railroads limited by rail-bound maintenance equipment that can work only at hours convenient to train schedules. Construction machines — *tractors, bulldozers, scrapers* — termed "off-track equipment" because they work FREE of the rails — strengthen and widen roadbeds as trains go through on schedule.

Fast, powerful Allis-Chalmers 2-Cycle Diesel tractors work every hour of every shift. There is no interference with traffic as they quickly build up shoulders and slopes, repair washouts, clean ditches, clear slides, move snow . . . handle any grading or maintenance on short notice, anywhere, any time!

Tractors and tractor equipment build modern travelways — *roadbeds, highways, airports.* Yes, it will be fun to travel — *by train, auto or plane* — faster, smoother, with greater safety.

ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

2-CYCLE DIESEL CRAWLER TRACTORS
ROAD MACHINERY
FARM AND INDUSTRIAL WHEEL TRACTORS
FARM EQUIPMENT

GROUNDWORK FOR THE NEW ERA OF TRANSPORTATION

Free

10½ x 13½ inch reprints of the POST advertisement "Travel Is Fun", attractively reproduced in four colors. Please let us know the quantity desired.

"where the heck is Joe?"

Who can say how much it is costing our railroads, just to get the answer to this one question?

However much it may be, the larger part of it could be saved through the use of a Stromberg-Carlson Sound System. Not only can one of these Stromberg-Carlson Sound Systems save you time, money, and energy in almost every aspect of your intra-organization communications, it can also serve as a highly effective builder of passenger good-will.

News, music, and special notices can be broadcast, and the arrival and departure of trains announced. Many of the new trains are being sound-equipped for the calling of stations, announcements, and the entertainment of passengers.

Stromberg-Carlson Sound Systems are also being used for the locating and directing of railroad employees; the operation of yards, freight houses, stores, and shops; and the handling of many other operating functions.

No matter how large or small your sound equipment requirements, you will find their answer in the new Stromberg-Carlson line—designed and built expressly to withstand the hard usage of railroading.

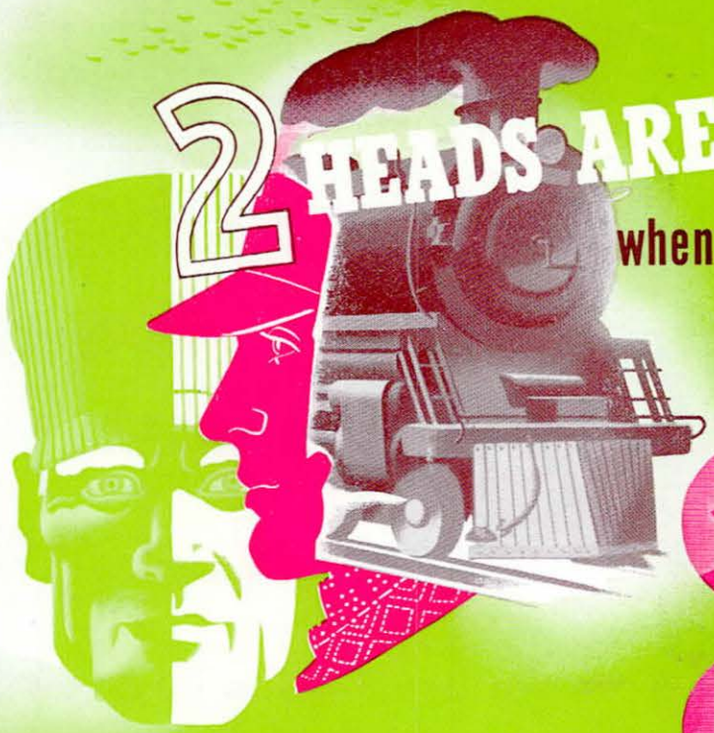
Your local Stromberg-Carlson sound equipment engineer-distributor is at your service to tell you more about the many uses of sound equipment, and to recommend the Stromberg-Carlson Sound System best suited to your specific needs. He is listed in your classified telephone directory. Or, if you prefer, you may write Sound Equipment Division, Stromberg-Carlson Company, Dept. R3, 320 Goodman St., Rochester 7, N. Y.

STROMBERG-CARLSON

STRAIGHT-LINE STROMBERG Sound CARLSON **COMMUNICATION**

2 HEADS ARE BETTER THAN 1!

when it comes to running a locomotive



Also when it comes to providing

TROUBLE-FREE BOILER WATER

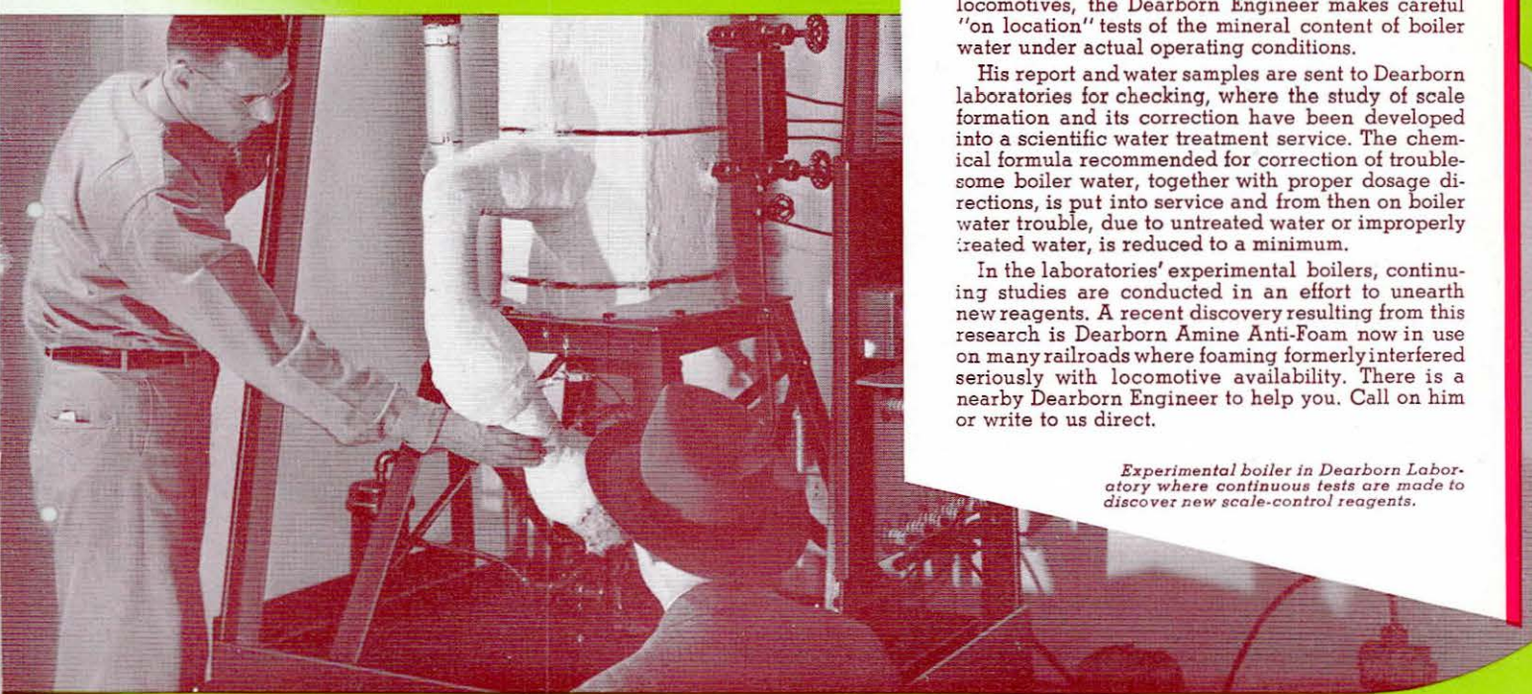
1 DEARBORN ENGINEER SPOTS THE TROUBLE

2 DEARBORN LABORATORY COMES UP WITH THE ANSWER

When, for example, scale encrusts boiler tubes on locomotives, the Dearborn Engineer makes careful "on location" tests of the mineral content of boiler water under actual operating conditions.

His report and water samples are sent to Dearborn laboratories for checking, where the study of scale formation and its correction have been developed into a scientific water treatment service. The chemical formula recommended for correction of troublesome boiler water, together with proper dosage directions, is put into service and from then on boiler water trouble, due to untreated water or improperly treated water, is reduced to a minimum.

In the laboratories' experimental boilers, continuing studies are conducted in an effort to unearth new reagents. A recent discovery resulting from this research is Dearborn Amine Anti-Foam now in use on many railroads where foaming formerly interfered seriously with locomotive availability. There is a nearby Dearborn Engineer to help you. Call on him or write to us direct.



Experimental boiler in Dearborn Laboratory where continuous tests are made to discover new scale-control reagents.

Dearborn
TRADE MARK REGISTERED

"THE LEADER FOR OVER HALF A CENTURY"

ENGINEERING SERVICE AND WATER TREATMENT

Dearborn Chemical Company

310 S. Michigan Ave., Chicago 4 807-15 Mateo St., Los Angeles
205 E. 42nd St., New York 2454 Dundas St., West, Toronto

IT TAKES MORE THAN THIS TO SOLVE

CORROSION PROBLEMS

. . . IT TAKES

an original study

OF EACH PROBLEM

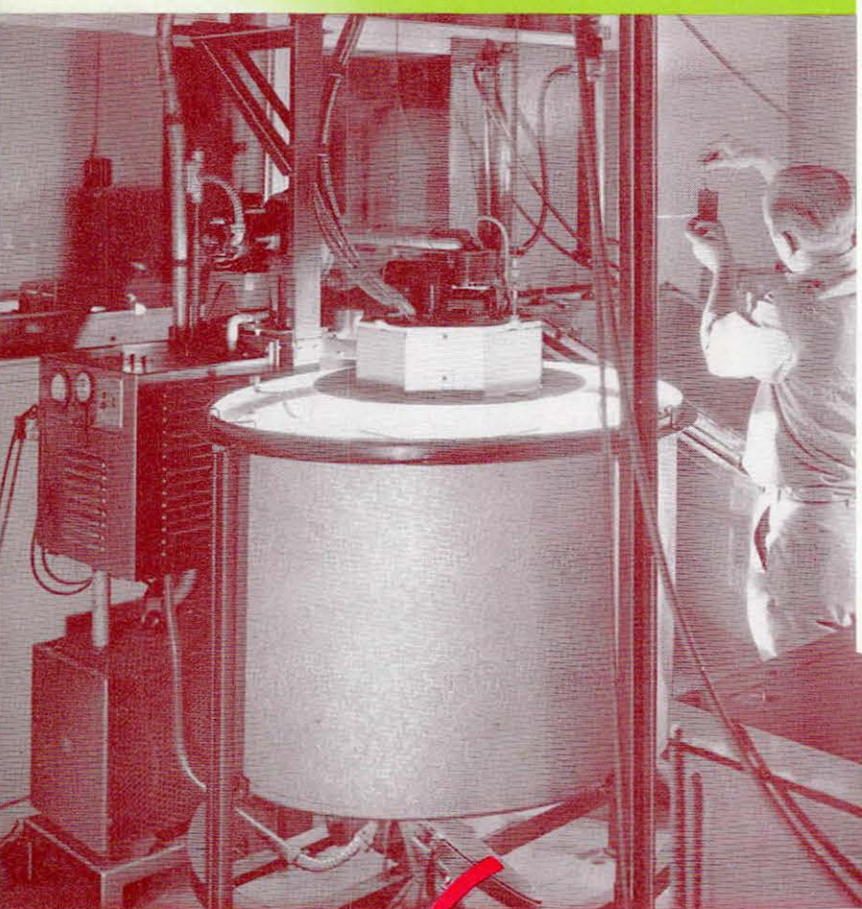
Corrosion problems are not solved here by a packaged formula. They are solved only after individual study, and the scientific development of correct preventive materials to suit the specific job.

In the laboratory scene at the left, an accelerated test is being made on the weatherometer to determine the lasting qualities of various formulations of NO-OX-ID when applied to metal surfaces exposed to accelerated atmospheric conditions.

For over a quarter-century railroads have successfully applied NO-OX-ID to bridges, signal towers, water tanks, and many other structures to stop loss of metal and prevent deterioration due to corrosion.

It is only after continuous tests and tailoring NO-OX-ID to the specific job, that various formulations of NO-OX-ID are made available for the specific need. You are invited to consult us on all corrosion control problems.

Weatherometer in Dearborn Laboratory where materials are tested under accelerated atmospheric conditions.



NO-OX-ID
IRON + RUST

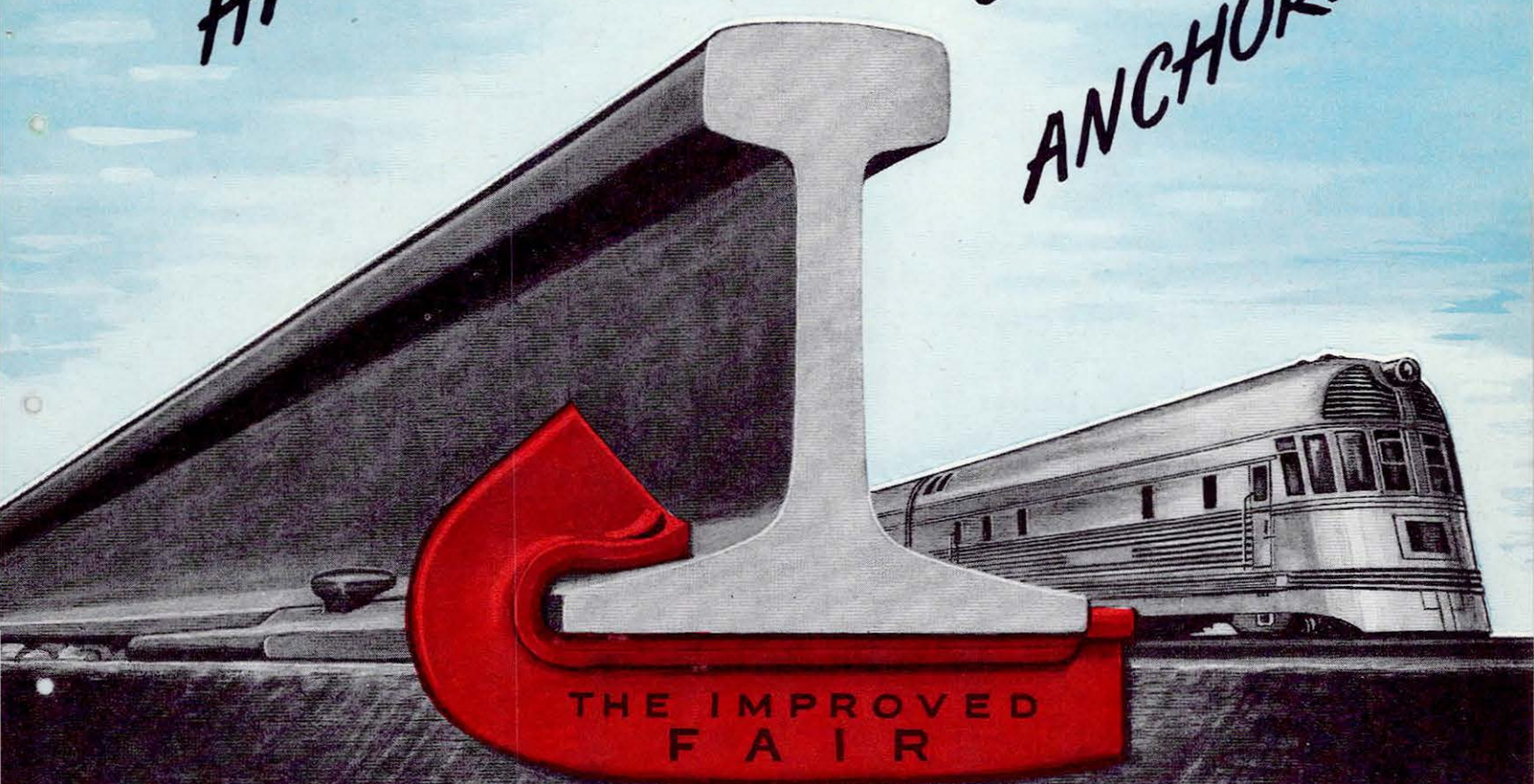
REG. TRADEMARK
AUG. 27, 1918

The ORIGINAL RUST PREVENTIVE

Dearborn Chemical Company

310 S. Michigan Ave., Chicago 4 — 807-15 Mateo St., Los Angeles
205 E. 42nd St., New York — 2454 Dundas St., West, Toronto

MODERN HIGH SPEEDS REQUIRE SAFE ANCHORAGE

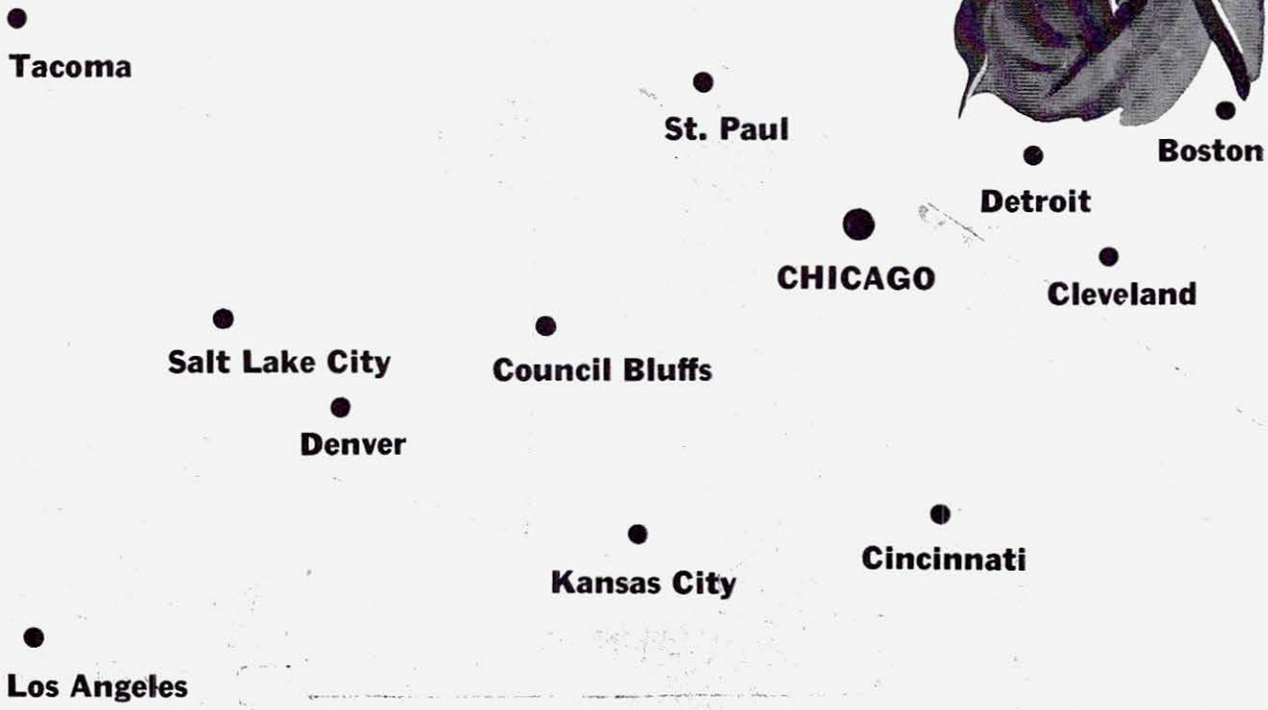


THE P. & M. CO.

CHICAGO • NEW YORK • DENVER CLEVELAND • ST. PAUL
WASHINGTON • ST. LOUIS BOSTON • SAN FRANCISCO

As easy to order as reaching for your telephone

GRIFFIN
CHILLED WHEELS



EASILY ORDERED . . . PROMPTLY DELIVERED

because of our having twelve strategically located plants that are supplying the railroads with over 1,000,000 chilled wheels annually.

For prompt deliveries of Griffin Chilled Wheels write or call your nearest Griffin Plant.

GRIFFIN WHEEL CO.
410 N. MICHIGAN AVE., CHICAGO 11, ILLINOIS

Member — Association of Manufacturers of Chilled Car Wheels

"THE Trend IS TO Blends"

SAYS THE PRESS

Among the most interesting decorative fabrics to emerge as a result of the various man-made fibers . . . will be those which combine these synthetics with each other and with natural fibers.

—*Retailing Home Furnishings*
January 2, 1946.

The latest trend in the textile world is blending fabrics, combining desirable properties. One may give strength, another softness and a third, absorption.

— *New York World-Telegram, January 4, 1946.*

—*Good Housekeeping, September 1945*

Blended fabrics

ARE PART OF POSTWAR PLANNING

Rayon and wool wi
the ingredie

➡ It's a new, exciting story for millions

➡ It's a familiar story to GOODALL who pioneered *Blended-for-Performance* fabrics

●Long before blended fabrics attained their present prominence in the news, Goodall was presenting to consumers and industries the advantages which can only be achieved by blending different fibers and yarns.

In other words, Goodall foresaw the trend that is now so evident everywhere in the industry—and planned for it. Goodall began specializing in blending fibers and yarns to create miracle fabrics . . . to serve special purposes supremely well.

The outcome has been that through longer and greater experience Goodall attained leadership with its many *Blended-For-Performance* Fabrics.

As the trend to blends progresses and grows, Goodall stylists and technicians will be maintaining this leadership . . . constantly designing, experimenting and testing to create new and better *Blended-For-Performance* Fabrics. Watch for them. They'll be in the news—in the *headline* news.

Goodall Fabrics INC.

Subsidiary of Goodall-Sanford, Inc.

THE FINEST NAME IN FABRICS

Offices in Boston, New York, Detroit, Chicago, Los Angeles

LOCOMOTIVE SERVICE STATIONS

MORE than 700 locomotive service stations have been designed and constructed on 70 railroads in the United States by Ogle Construction Co., since its organization in 1911.

They range from large capacity, multi-track coaling stations that deliver up to 3,000 tons of coal per day to single track, direct coalers that handle 2 or 3 cars per week —

From complete gravity sand plants constructed integrally with coaling stations that elevate, dry and deliver more than a car of sand per day to the conventional ground storage sand plant that handles one car a month —

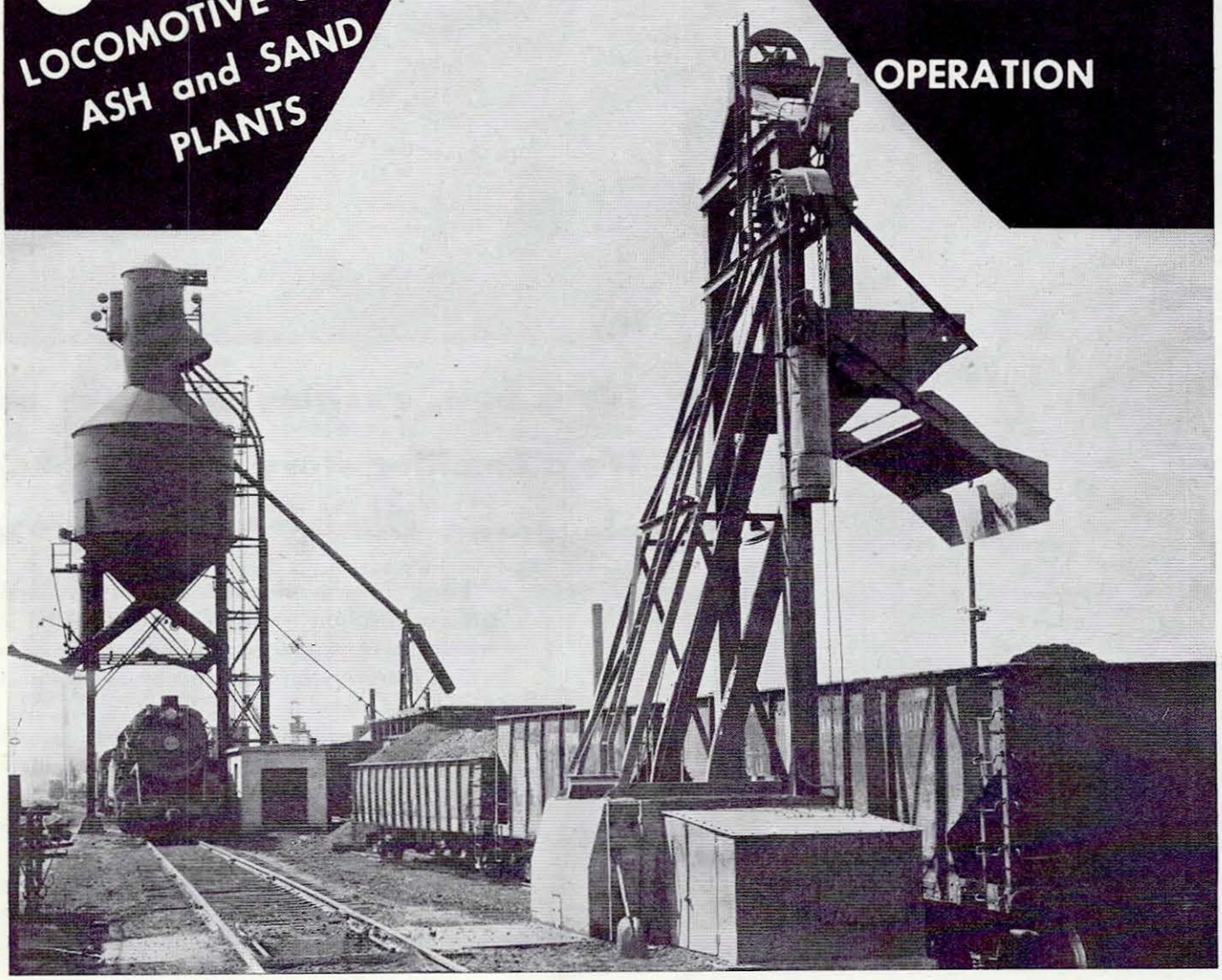
And from 2 and 3 track ash handling plants that function efficiently day after day under the heavy duty of high speed main line service to the low cost single track plant that disposes of the ashes from only a few yard engines per day.

Whatever your operations might demand in the nature of locomotive coal, sand and ash handling facilities, those demands will be fulfilled to your entire satisfaction with an OGLE PLANT.

OGLE

LOCOMOTIVE COAL ASH and SAND PLANTS

FOR MODERN RAILROAD OPERATION



OGLE CONSTRUCTION CO.

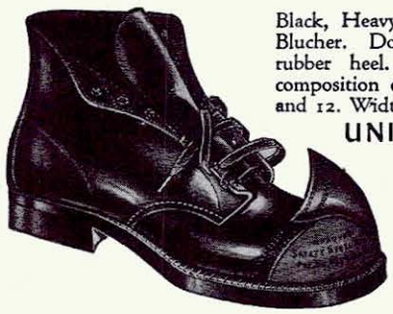
28 E. JACKSON BLVD.
CHICAGO

STOP
LOOK
LISTEN

On some twenty-three railroads in the United States our steel toe safety shoes can be purchased in the railroads' company stores on a pay roll deduction plan. If the railroad where you are employed is one of those having our service, you will find the right shoe for your job made of the right materials to give WEAR and also a correct fit to give COMFORT. Ask your nearest Railroad Stores Department for information.

***Shoes for* TRACKMEN — WAREHOUSEMEN — SHOPMEN — TRAINMEN — FOREMEN**

HEAVY OUTSIDE WORK



Black, Heavy, Work-Shoe Leather Blucher. Double leather outsole, rubber heel. Also available with composition outsole. Sizes 5 to 11 and 12. Widths D, EE.

UNION MADE

Safety First SHOE COMPANY

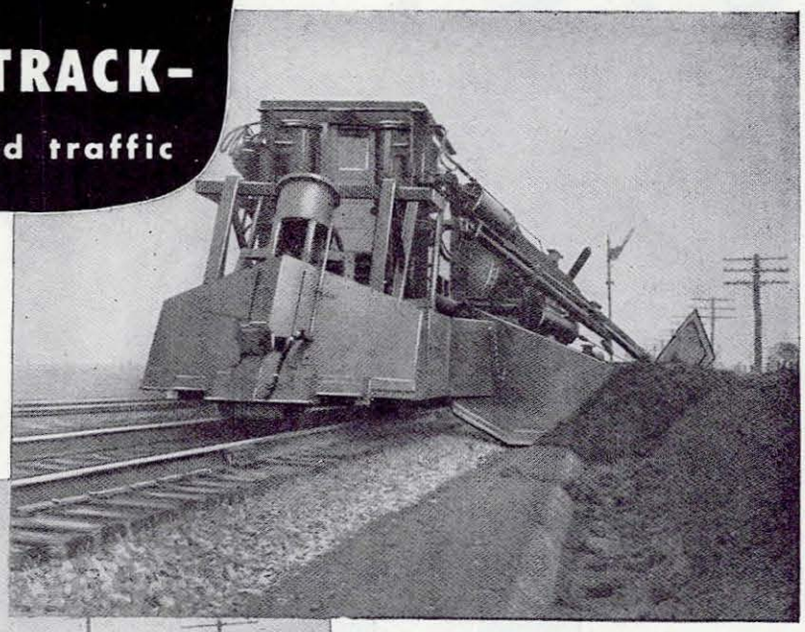
HOLLISTON, MASSACHUSETTS

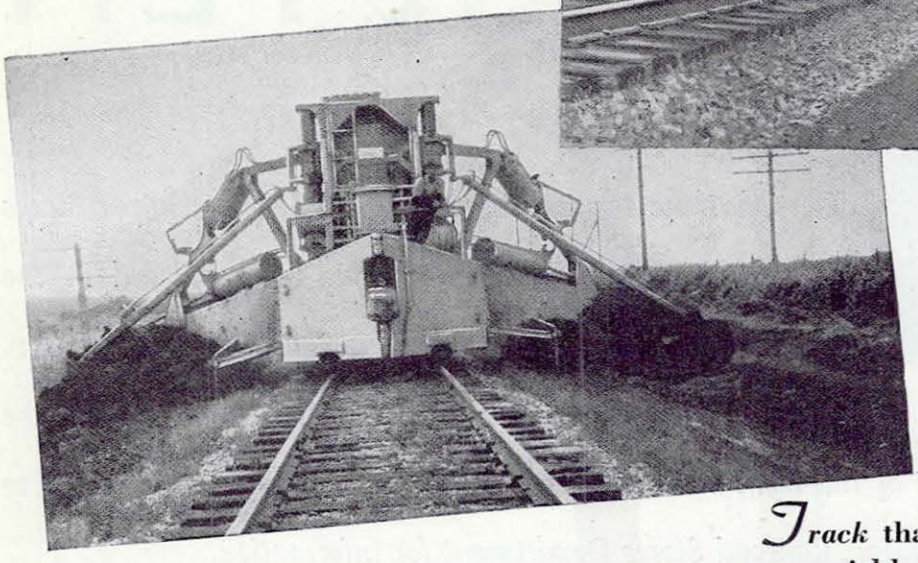
Makers of Industrial Shoes for a Half Century

I NEED WELL DRAINED TRACK—

says modern high speed traffic

...and experienced maintenance men find effective, low cost answer in the **JORDAN SPREADER-DITCHER**





Establishing true road-bed section and a clean, effective ditch essential for proper drainage—Standard Type Spreader-Ditcher at work

Dragging dirt from a cut and widening the fill—Type A Spreader-Ditcher with both wings converted to carrier wing position.

Track that lacks proper drainage quickly becomes costly track to maintain—especially under the steady punishment of vast modern tonnages and growing high speeds. Moral—use the JORDAN. This huge, powerful "mechanical crew" was developed by railroad men *to answer a difficult, costly maintenance problem*—which it did. It performs a wide variety of essential maintenance tasks—cuts ditches, shapes roadbed, plows ballast, moves earth and clears snowbound track: and does these essential tasks faster, with big savings of manpower and dollars.

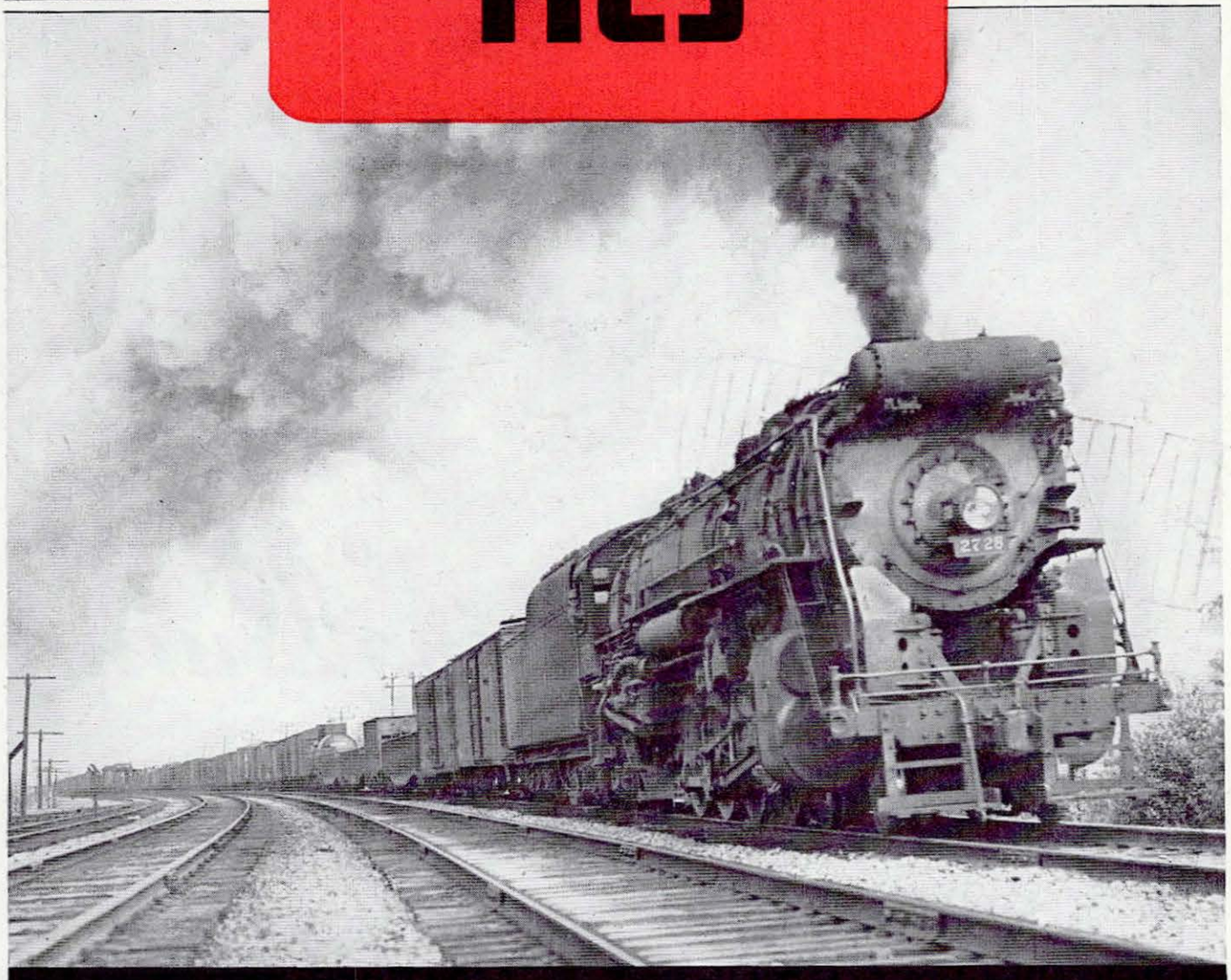
To *see* the Jordan at work—for railroads, on industrial plant jobs, in mining operations—write for the new Jordan Book: contains over 100 action and detail pictures. Sent only to industrial executives' requests on business letterheads.

O. F. JORDAN COMPANY

WALTER J. RILEY, *President*

EAST CHICAGO, INDIANA

AMCRECO TIES



Low maintenance-of-way insurance!

AMERICAN CREOSOTING COMPANY
INCORPORATED

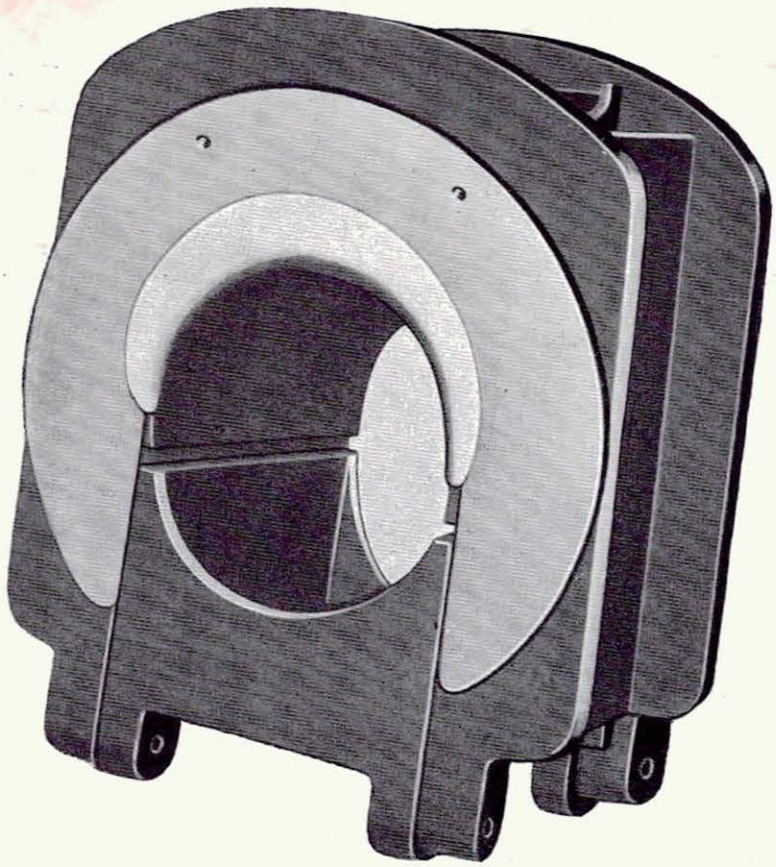
COLONIAL CREOSOTING COMPANY INCORPORATED

AMCRECO LOWRY PROCESS CREOSOTED WOOD

GEORGIA CREOSOTING COMPANY INCORPORATED

ADDRESS INQUIRIES TO CHICAGO, ILL., OR LOUISVILLE, KY.

TIES · POLES · PILES · TIMBER



Satco-Faced
Locomotive Driving Box

IMPROVED *Bearing Lining*

MAGNUS BEARING IMPROVEMENTS

1. Improved Bearing Metal Composition
2. Improved Satin Finish Broaching
3. **Improved Denser Lining Metal**
4. Improved Stronger Lining Bond
5. Improved Finer Finishing Equipment
6. Improved Automatic Heat Control

Magnus Bearing linings are now being applied by a new casting method which eliminates voids and assures maximum density and uniformity of the lining metal.

SATCO Bearing Metal

MODERN HEAVY DUTY BEARINGS

MAGNUS METAL CORPORATION
CHICAGO NEW YORK

1602

Tame THOSE HARD-TO-OPEN END DOORS WITH NP AUTOMATIC END DOOR OPERATORS

MAKE the end doors obedient to your passengers' fingertouch—with N. P. automatic operators. No more pushing and pulling! Obstinate end doors open and close effortlessly and safely.

N. P. automatic operators are available for either swinging or sliding doors. They're mounted out of sight. Doors respond promptly the instant the latch is released. There's no pressure build-up . . . no slamming. Door motion reverses automatically at a touch of interference. And the action is timed to prevent unnecessary loss of conditioned air.

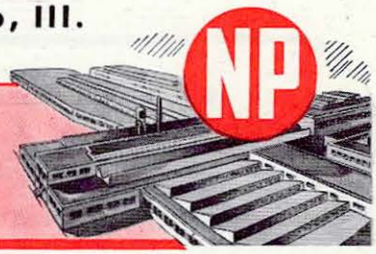
Write today for full information.

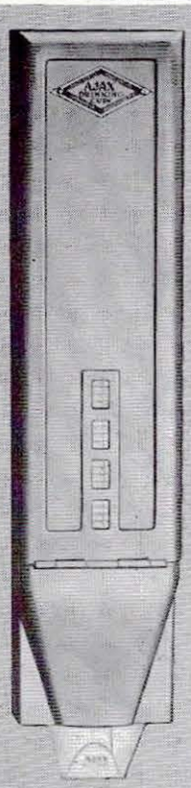
NATIONAL PNEUMATIC COMPANY

New York, N. Y. ★ Rahway, N. J. ★ Chicago, Ill.

WORLD'S LARGEST BUILDER OF DOOR CONTROL EQUIPMENT

FOR MASS TRANSPORTATION VEHICLES





1. AJAX

2. AERO

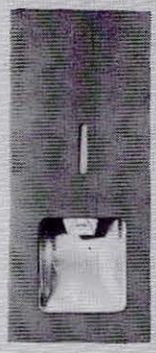
1. Ajax Standard Steel Wall Type Dispensers—hold better than 250 cups. Filled directly from the cartons in which they are packed, without handling the cups themselves. Dispense one cup at a time. Attached directly to car walls or partitions.

2. Aero Standard Steel Wall Type Dispensers—new graceful design, fills from the bottom—just push the cups in. Harmonizes with car interiors.

3. Ajax Recessed Steel Dispensers—panel flush with car walls or partitions—can be installed in any location convenient to water supply. Designed for easy and rapid servicing.

4. New Aero Steel Dispenser designed for roomette, bedroom and compartment service in the latest type cars. Filled by simply pushing cups up into dispenser.

4. AERO



3. AJAX

From Border to Border and Coast to Coast

Ajax and *Aero Drinking Cups* and *Dispensers* are recognized as *the leaders* in modern railway drinking cup service.

Ajax Cups are wedge shape to fit the contour of the hand. As this cup has no tendency to jump out of the hand, passengers find it an easy cup to use even while the train is in motion.

Aero round cups with firm rolled rim and interlocked bottom provide deluxe drinking facilities for those who require a cup of conventional form.

Both types of cups are packed in dustproof cartons ready for quick and easy filling of dispensers.

Years of experience in serving railroads have made the names "Ajax" and "Aero" stand out pre-eminently as symbols of the best, both in product and service.

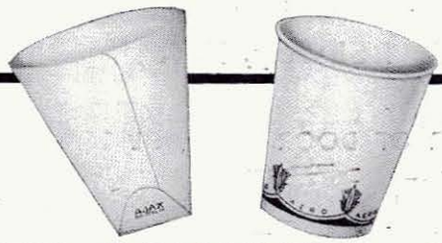
LOGAN DRINKING CUP CO., *Division*
68 Prescott Street, Worcester 5, Mass.

U. S. ENVELOPE CO., *San Francisco Division*
416 Second Street, San Francisco 7, California

Divisions of

UNITED STATES ENVELOPE COMPANY

CR-4



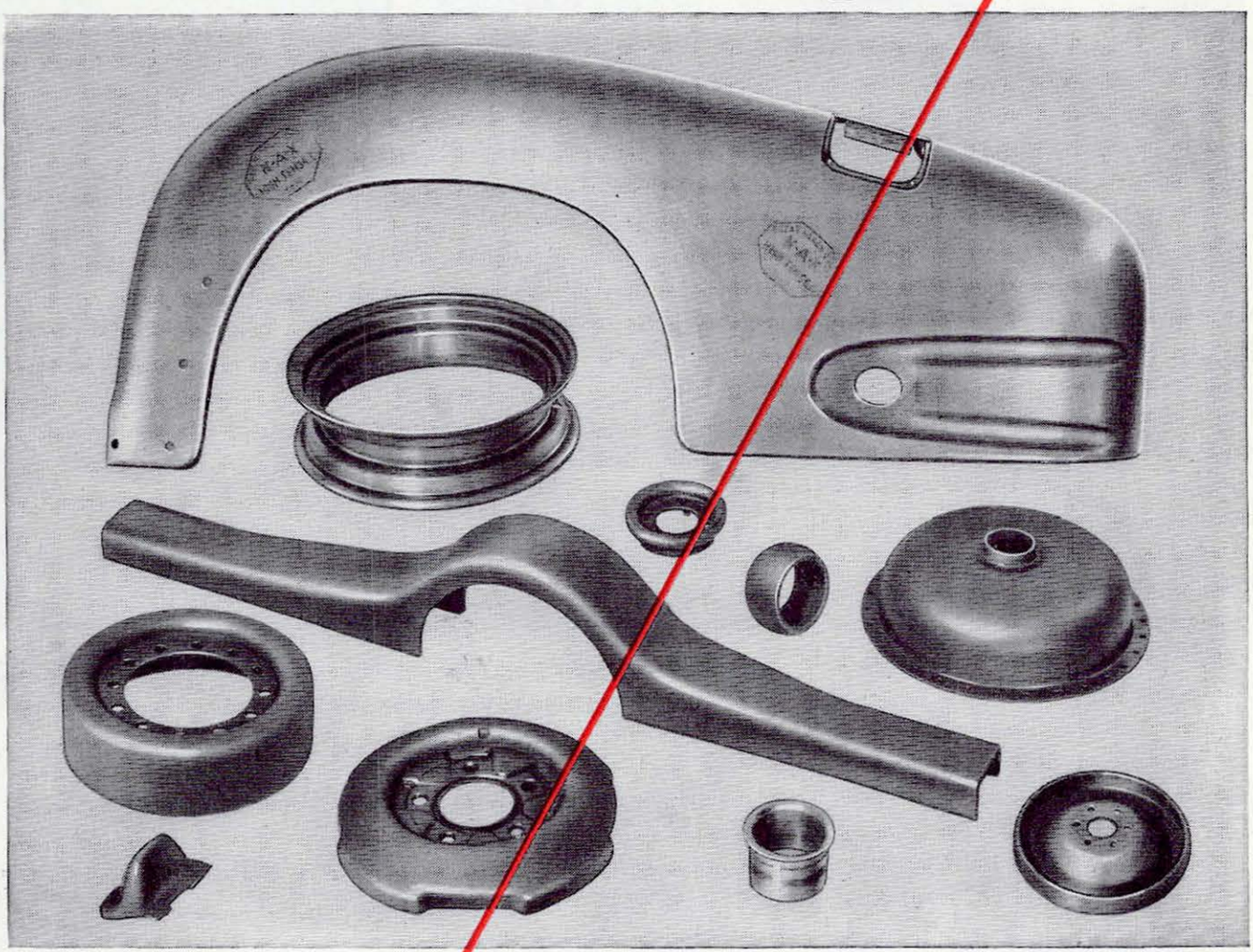
AJAX AERO

PAPER DRINKING CUPS

WHEN WE SAY *EXCEPTIONAL FORMABILITY*...

here's what we mean!

N-A-X
HIGH-TENSILE STEEL



These are not an artist's conception of shapes that can be fabricated with a high-strength steel. They are actual parts produced with *N-A-X High-Tensile* by manufacturers who have learned that *great strength and exceptional formability* are available in one great steel. ¶ If you have a problem that involves the fabrication of high-strength steel—if you have a product that could command the market if it were stronger, longer-lasting or lighter—consult Great Lakes Steel Corporation.

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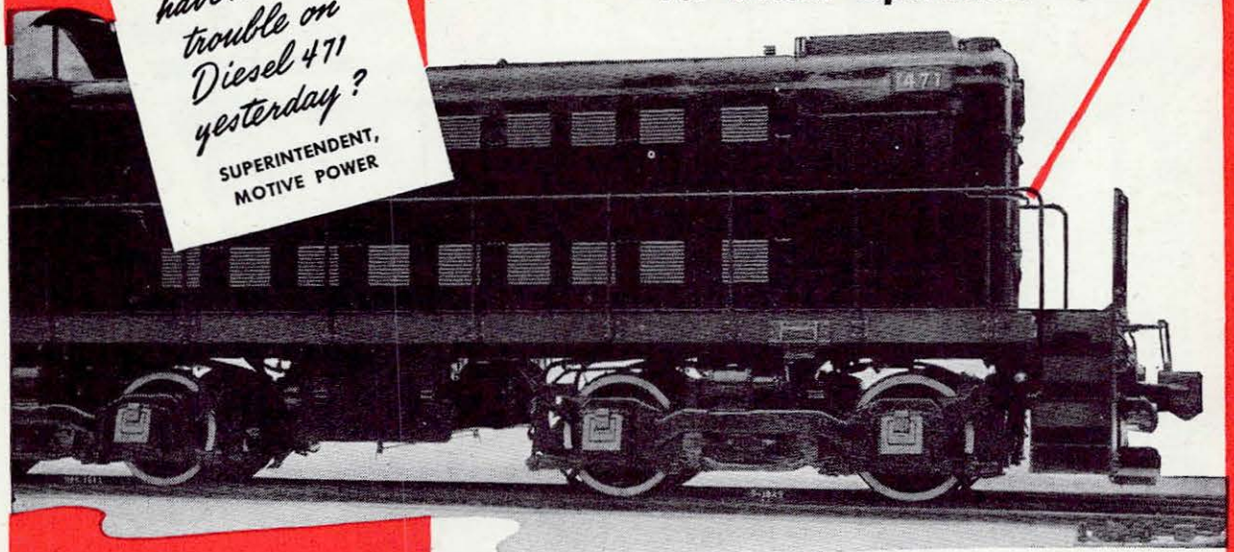

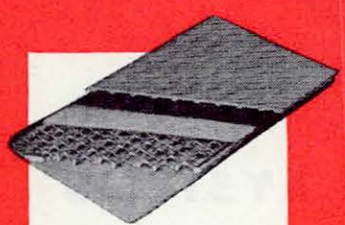

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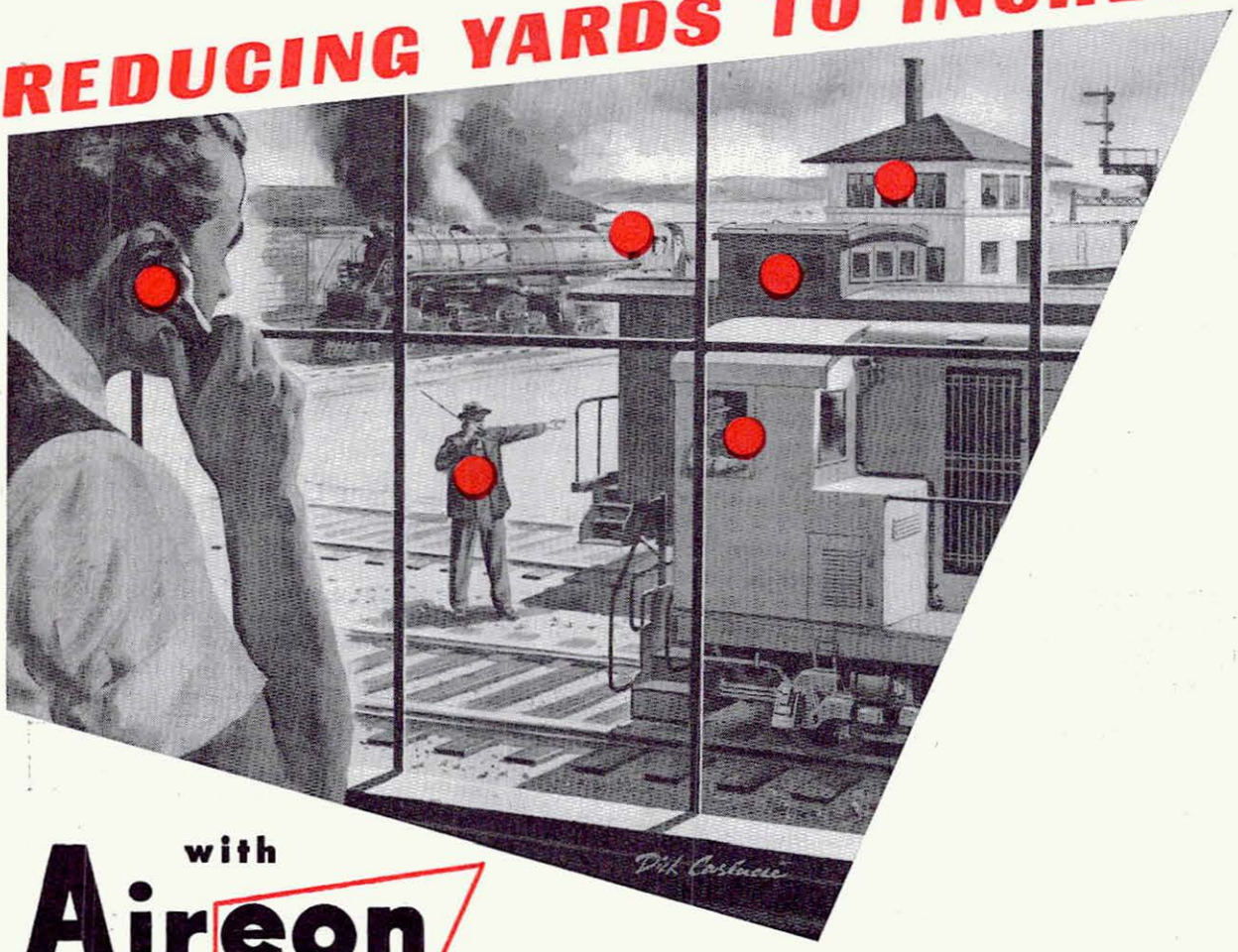

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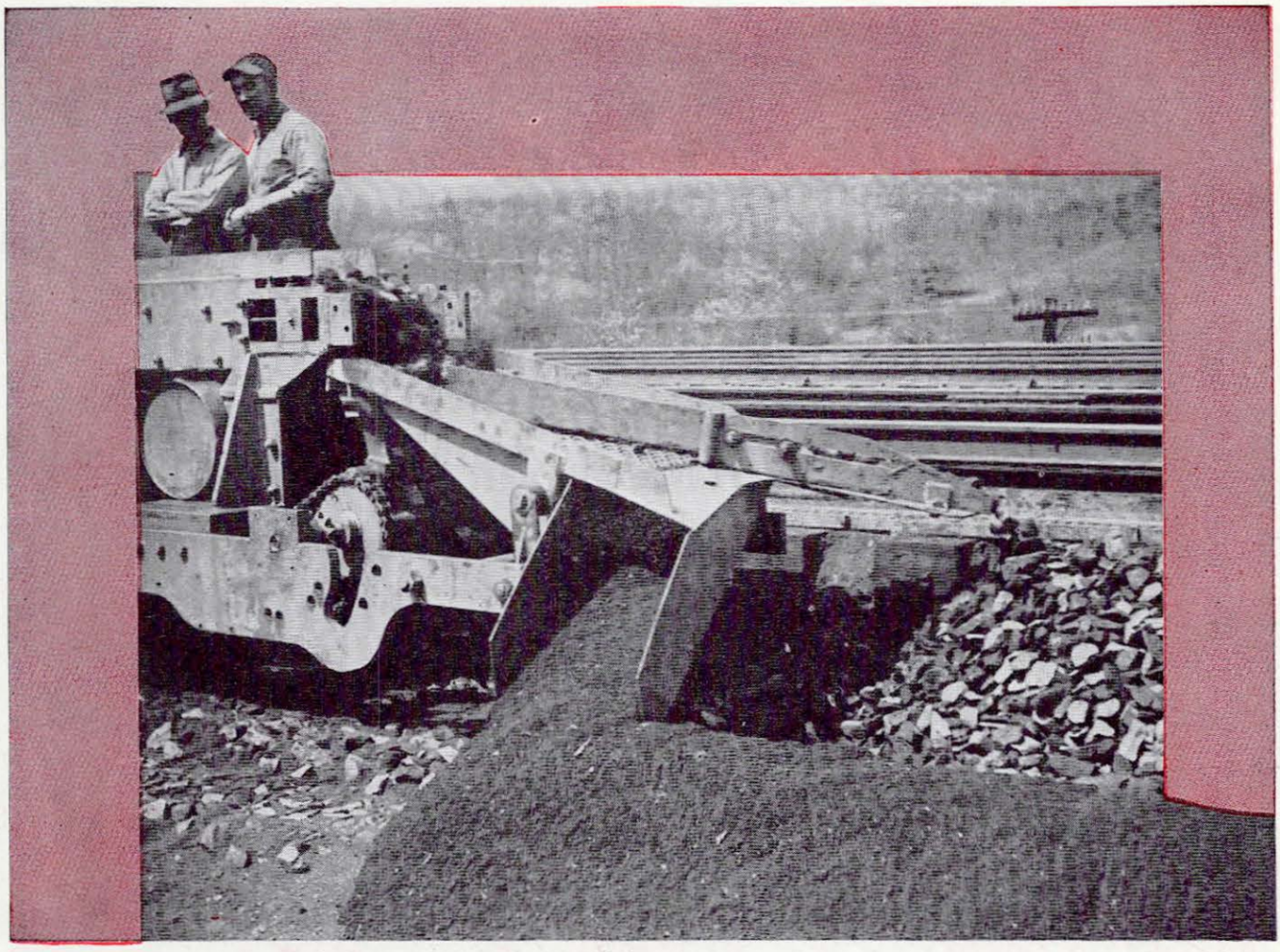

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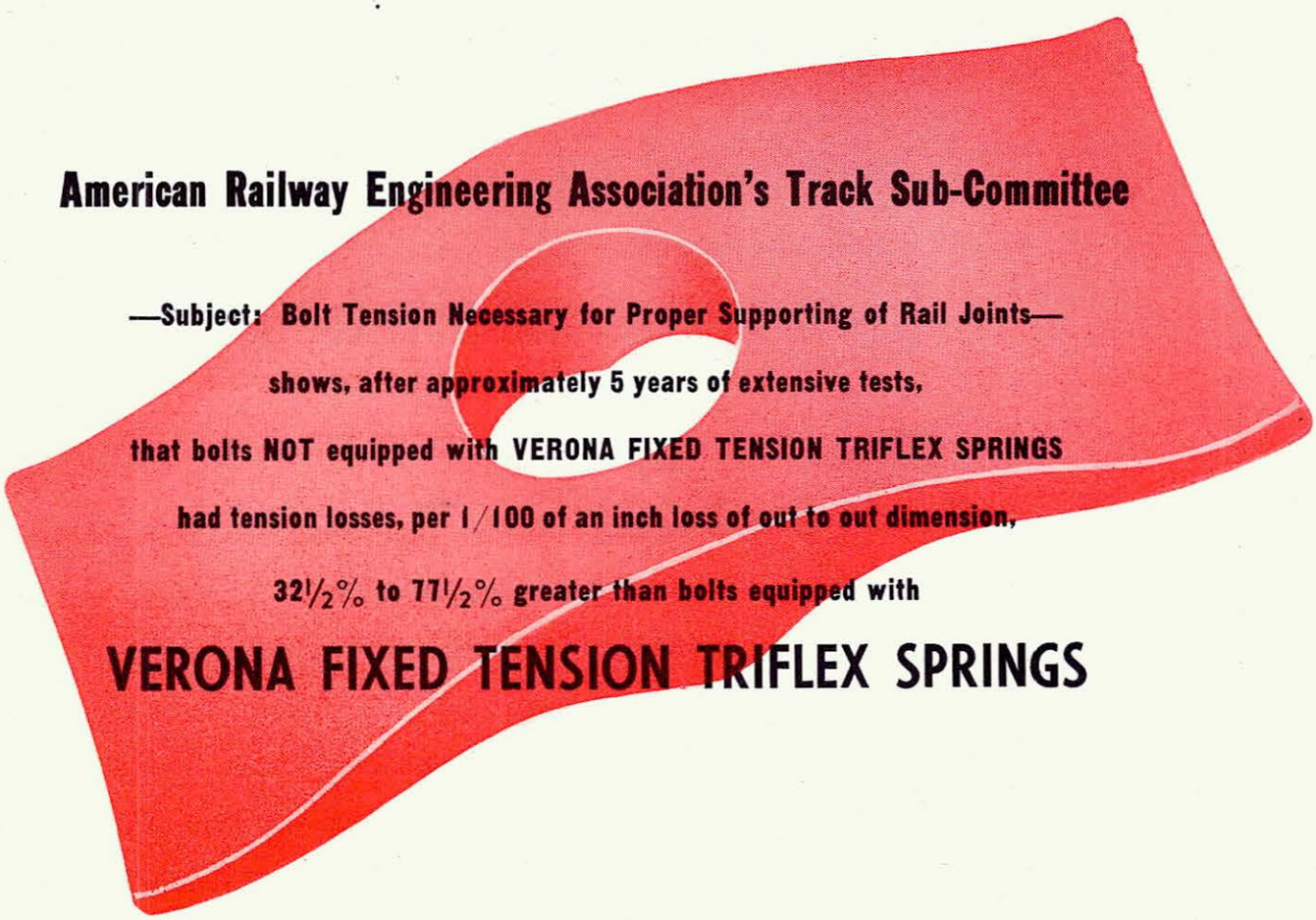

American Railway Engineering Association's Track Sub-Committee

—Subject: Bolt Tension Necessary for Proper Supporting of Rail Joints—

shows, after approximately 5 years of extensive tests,

that bolts NOT equipped with VERONA FIXED TENSION TRIFLEX SPRINGS

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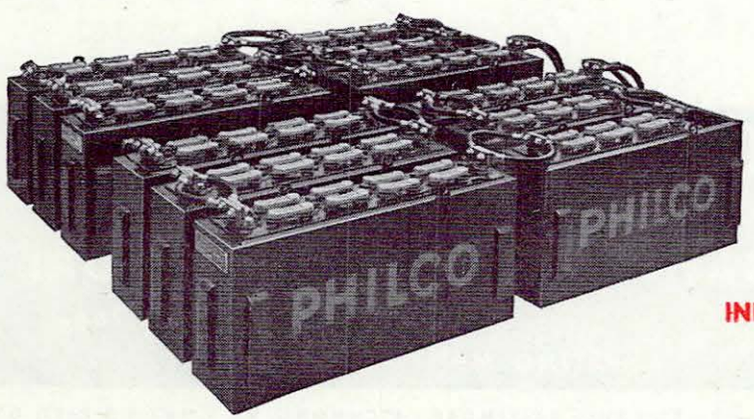

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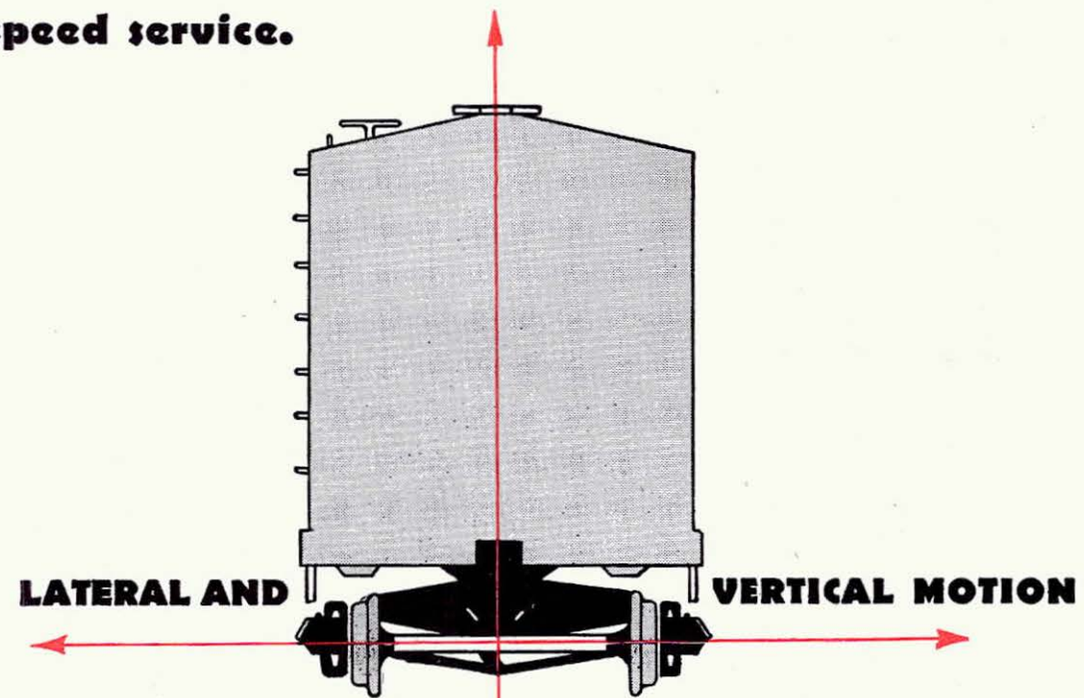

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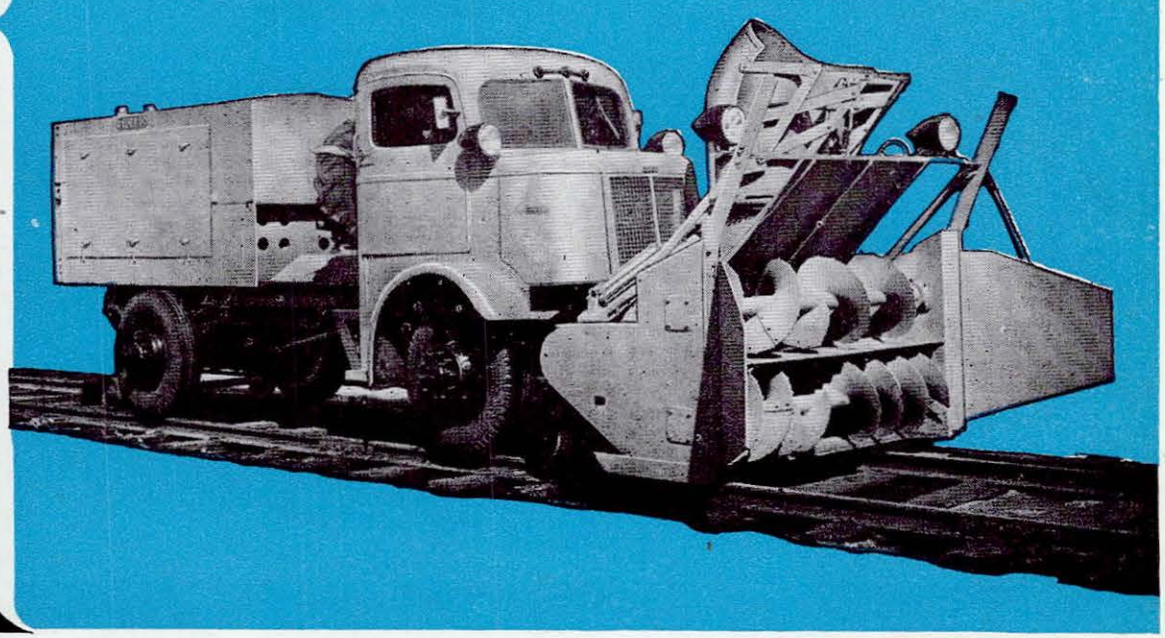

*Hard Coal Cars

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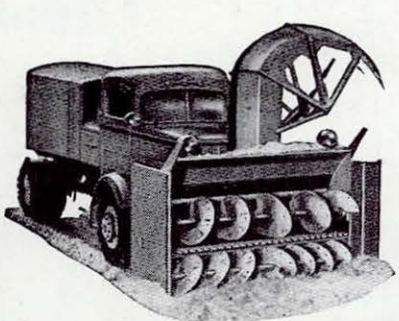

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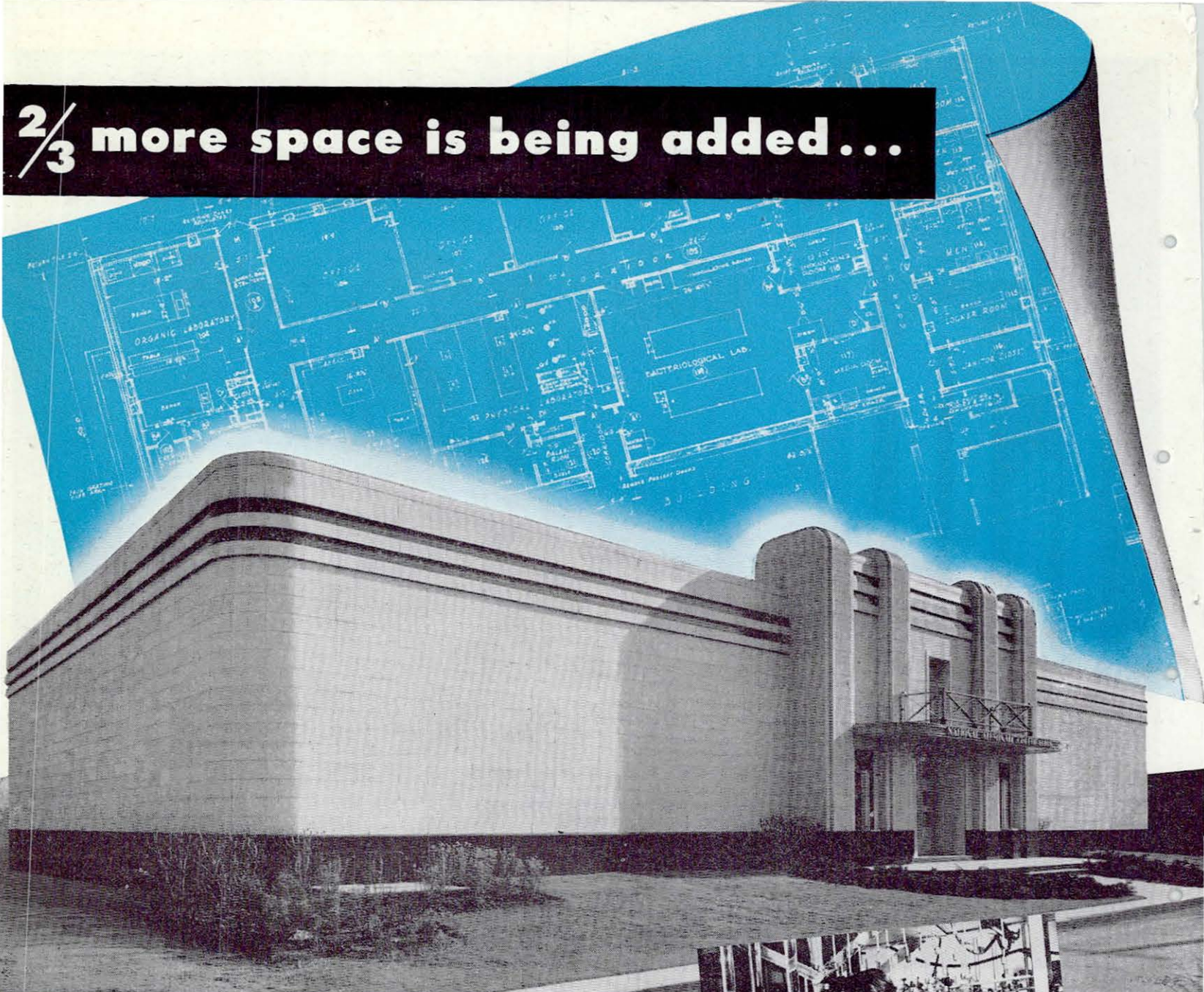

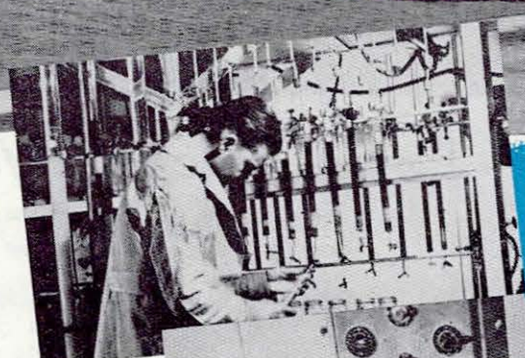

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—The Complete Water Treatment System

Railway Age

With which are incorporated the Railway Review, the Railroad Gazette, and the Railway Age-Gazette. Name registered in U. S. Patent Office.

Vol. 120 March 16, 1946 No. 11

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In This Issue

New Process Seasons Ties Overnight ***538***

Because vapor drying relieves seasoning stresses, red oak ties show less checking than air-seasoned stock after two years in test track. Procedure also speeds pole and lumber production.

A. R. E. A. Convention ***545***

American Railway Engineering Association resumes annual meetings, twice omitted during war. Engineering problems of improving the railroads' competitive position emphasized.

EDITORIALS

"Labor's Share" of the Railway Dollar 535
For Lack of a Car— 536
Attention, Managements 537
How to Make Coffee 537

GENERAL ARTICLES

New Process Seasons Ties Overnight—Part II 538
Designing Passenger Cars and Airplanes, by Col. E. J. Ragsdale 542

COMMUNICATION AND BOOK **544**

A. R. E. A. CONVENTION **545**

Engineering Officers Resume Annual Meetings—Consider Many Problems at Chicago 546
N. R. A. A. Again Passes Annual Exhibit 564

NEW AND IMPROVED PRODUCTS **565**

GENERAL NEWS **575**

WITH THE GOVERNMENT AGENCIES **583**

REVENUES AND EXPENSES OF RAILWAYS **601**

OPERATING REVENUES AND EXPENSES—CLASS I STEAM RAILWAYS **604**

The Railway Age is indexed by the Industrial Arts Index and also by the Engineering Index Service.

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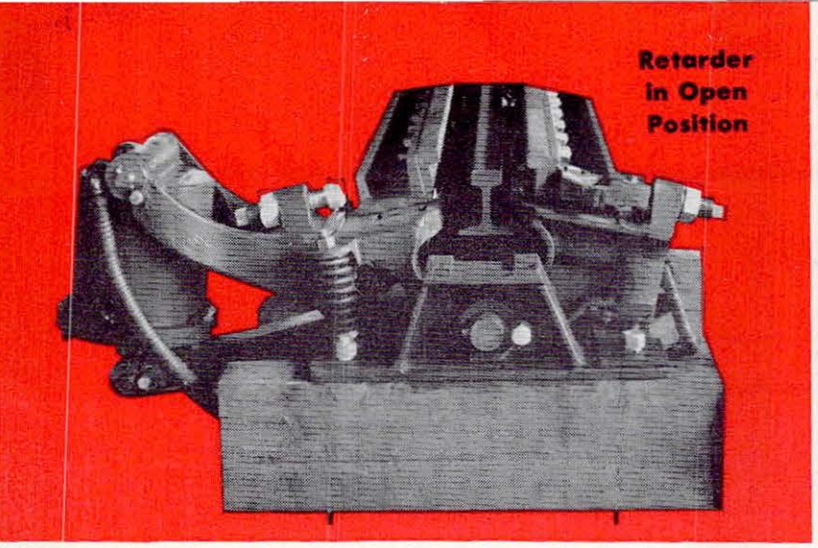

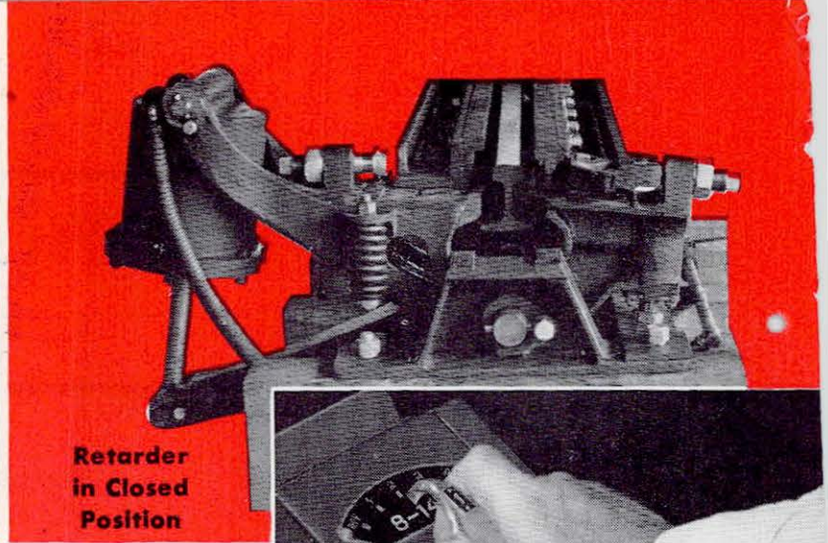

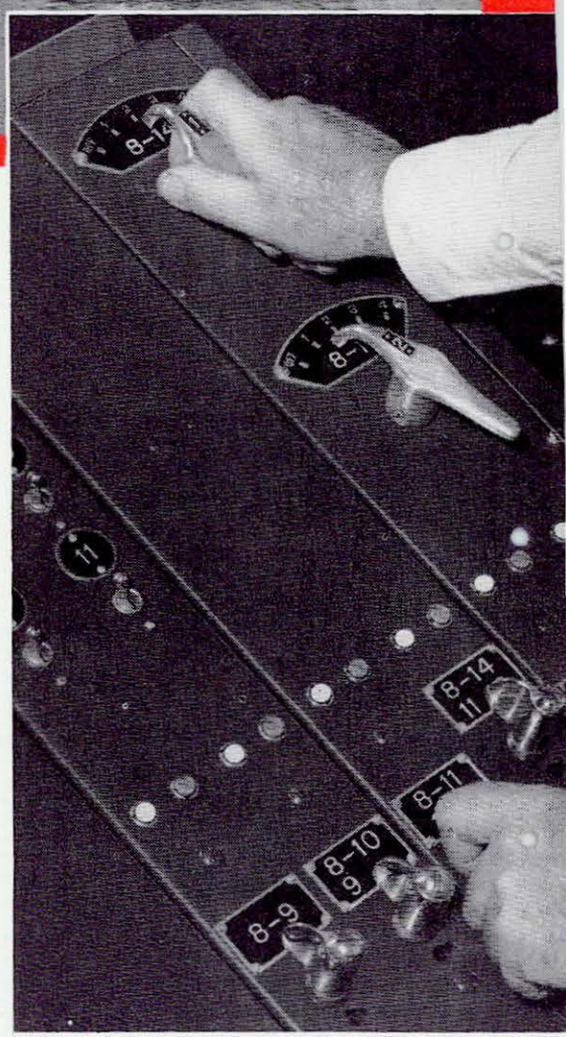

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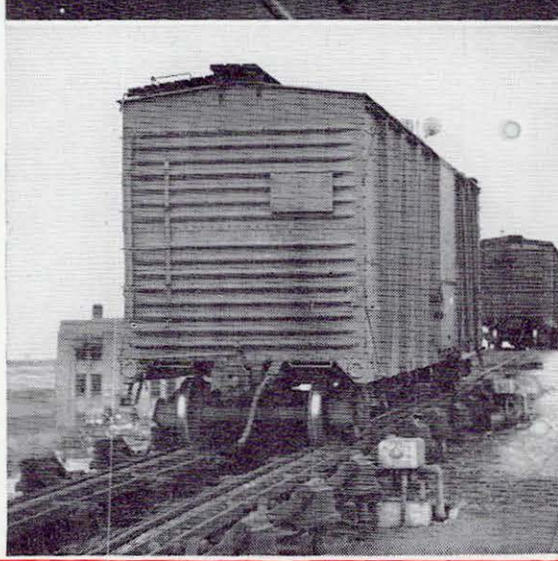

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The Week at a Glance

A. R. E. A. RESUMES: Engineering and maintenance officers of United States and Canadian railroads gathered in Chicago this week where the American Railway Engineering Association held its 45th annual convention—marking resumption of the yearly-meeting practice which was interrupted twice during the war. The bulk of this issue's feature section is devoted to coverage of that meeting with its timely addresses and committee reports bringing up to date much technical information of interest to the engineers. Emphasis was on the peace-time needs of railroad fixed properties in the face of pressing demands for better service and maximum efficiency in maintenance and operations. The election elevated the Southern's chief engineer, J. B. Akers, to the association presidency.

●

EXHIBIT-IN-PRINT: Despite the earnest desire of the National Railway Appliance Association to hold an exhibition in connection with the A. R. E. A. convention, this valuable show had to be canceled again for reasons set forth in letters from President W. J. Hanna and Secretary C. H. White. Meanwhile, this issue's advertising displays and its feature pages devoted to descriptions of new and improved products of the manufacturers combine to comprise a comprehensive exhibit-in-print.

●

GERMAN EQUIPMENT: Railroad equipment captured in Germany was placed on exhibition last week at Fort Monroe, Va., by the Army's Transportation Corps. The exhibit included five steam locomotives, a Diesel switcher with hydraulic transmission, and five freight cars—described briefly in a news story herein. Arrangements have been made whereby all of the equipment will be available for future inspection by representatives of science and industry.

●

GREEN LIGHT FOR LEA: The House committee on interstate and foreign commerce got the green light to proceed with its comprehensive investigation of the transportation situation when the House last week adopted Chairman Lea's resolution specifically authorizing the study. With the preliminary work of gathering views of interested parties well on the way to completion, the committee's procedure under its broadened authority is expected to take the form of an analysis and evaluation of these presentations rather than of extended hearings.

●

LABOR'S SHARE: Soaring general taxes paid by the railroads, and the assessment on them of payroll taxes which are but additions to wages, have created a situation wherein the operating revenue figures no longer measure the railroads' "ability to pay" in the same way they did prior to 1941; and the "aggregate compensation of employees" no longer states the expense to the railways in hiring labor. That is demonstrated by figures presented in this issue's leading editorial which takes as its text a quotation from testimony offered in the wage case by a witness for the employees, E. L. Oliver, who apparently relied on the reported figures to support his contention that employees are receiving a smaller proportion of the railroad dollar than they formerly received. The editorial shows how the employees' share snaps back to its pre-1941 pattern when figures used to calculate the ratio of employee compensation to revenues are adjusted in realistic fashion — by deducting from the operating revenue total all taxes except payroll taxes, and adding payroll taxes to the compensation-of-employees figure.

●

DESIGN THEORY: The late Colonel E. J. W. Ragsdale, who was chief engineer of the Edw. G. Budd Manufacturing Company's rail division at the time of his recent death, discussed passenger car and airplane designing in a paper presented at a February 13 meeting of the Southern Ohio Section, Society of Automotive Engineers. Colonel Ragsdale's address is reproduced in one of this issue's feature articles. In it he presented a theory of design for the layman, paid his respects to "redundant" structures, and described the Budd machine for testing complete car structures.

●

N. M. B. REPORTS: Reporting on its activities during the fiscal year ended June 30, 1945, the National Mediation Board complains again that a "disproportionate" amount of time and effort is spent by its members and staff in handling representation disputes between national labor organizations competing for the right to represent train and yard service employees. It is suggested that most of these jurisdictional controversies would never have arisen if the unions exerted the same efforts to agree among themselves on interunion matters that the Railway Labor Act enjoins upon carriers and employees in the making and maintaining of labor agreements. The fiscal year, as the board reviewed it, was marked by a "few local and unauthorized work stoppages," and by "only two authorized strikes."

●

GRAIN-CAR FACTS: Chairman W. C. Kendall of the Car Service Division appeared at last week's closing sessions of the Senate's St. Lawrence seaway hearings to refute charges of a railroad breakdown on handling the grain movement, which had been made by seaway proponents. The C. S. D. chairman gave the "true facts" with respect to railroad performance in handling the largest grain crops on record. His testimony is reported in a news story herein.

●

HONORS: The Medal of Merit, symbolic of "exceptional fidelity and exceptionally meritorious conduct," was awarded by President Truman to O. D. T. Director Johnson and A. A. R. President Pelley in ceremonies at the White House March 8. The accompanying citations were based on parts played by the recipients in the successful solution of World War II's domestic transportation problems.

ARBITRATION: Carrier presentations in the arbitration wage proceedings got under way this week with a meaty statement from Director Julius H. Parmelee of the Bureau of Railway Economics, who pointed out with supporting figures how prospective costs and wage rates must occupy an important place in any survey of the post-war railroad position, the carriers' "principal post-war concern" being centered on the volume of traffic they can obtain, and the cost levels at which they will be able to handle such volume. The A. A. R.'s traffic vice-president, A. F. Cleveland, followed through to show the rapid growth of water, air, and highway transport during the past 25 years; and to emphasize that "price and price alone" is the "fundamental factor" governing competition between railroads and other carriers.

●

EMERGENCY: Meanwhile the nation-wide strike which the Brotherhood of Railroad Trainmen and Brotherhood of Locomotive Engineers had scheduled for this week, was averted when President Truman appointed an emergency board to investigate the separate controversy growing out of the wage and rules demands of these non-conformists. The "fact-finders" went to work promptly, opening hearings at Chicago on March 12. The localized strike with which these two unions had threatened the Central of New Jersey was also postponed when the President issued an order naming that road as a party to the general emergency-board proceeding.

●

SHORTSIGHTED: Without discounting in any way the railroads' magnificent war-time record of efficient freight-car utilization, an editorial herein points out that a realistic attitude should indicate that this accomplishment was aided greatly by the heavy-loading war traffic and the increased average haul. It goes on to calculate prospective car requirements of the future, reaching the conclusion that 308,957 new freight cars would be needed to handle the demand for rail service if annual national income equals the predicted $150 billion. The editorial suggests that the wait-and-see attitude of railroad men with respect to placing orders for freight cars may be shortsighted.

●

PELLEY PROTESTS: An even more important objection to subsidized transportation than its adverse effect on overall costs of government is the increase in the total cost of carrying on the necessary transportation of the nation. That was emphasized by A. A. R. President J. J. Pelley in an address before the Omaha Chamber of Commerce this week. Mr. Pelley did not criticize the policy of providing waterway, airway and highway facilities, which are "public thoroughfares"; but he did insist that the railroads, which are also rendering a public service while bearing all their own costs in addition to paying taxes, have valid grounds for objection when user charges are absent or inadequate on facilities provided by the government for their competitors.

a 6 months' HEADACHE - but it's wearing off!

WE know you have plenty of headaches of your own. But listen to just one that is ours, and directly affects you.

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But as our program of reconversion progressed we found that the situation on steel deliveries—and other essential factors—were seriously handicapping us. It was found impossible to set up schedules which could be maintained with any degree of system or regularity.

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RAILWAY AGE

"Labor's Share" of the Railway Dollar

Testifying before the arbitration board in the operating unions' wage case in behalf of those organizations, Eli L. Oliver said (according to the March 9 issue of the publication "Labor"):

"In 1921, of every dollar of operating revenue, 50 cents was paid out in wages to railway workers. That declined through the 1920's, but in 1931 it was back at 50 cents out of every dollar. In the years just before the war the carriers were paying only 45.7 cents of each dollar they received to their employees, in spite of an increase in wage rates in 1937.

"So the amount of the wage increase was absorbed and the railways were still paying less by 4.3 cents of their revenues to the railway employees than had been true in 1931."

It is a hopeful augury that a man employed by the unions to analyze and interpret economic data for them should have detected the fact that there exists a persistent relationship between gross revenues received by the railways and total wages paid to railway labor; and that an increase in wages does not result in labor's getting a permanently larger share of the railroad dollar. Mr. Oliver did not develop the important implications of his observation, but they may be stated in general terms as follows:

Wage increases do not have the necessary or usual effect of increasing the total amount of money received by railway labor; rather, they cause the division of a predetermined sum of money among fewer employees. Wage increases, that is to say, are often made at the expense of total railway jobs; money with which to pay the higher wages of employees secure in their seniority is obtained by laying off men at the bottom of the seniority list (or by failing to hire new employees who, otherwise, would be put on the payroll).

Higher wages usually necessitate higher rates, or preclude reductions in rates which otherwise might be made, and higher rates may divert traffic to competing forms of transportation—which would probably reduce total railway revenues and hence the total compensation paid to railway employees. Since, as Mr. Oliver has pointed out, wage increases do not increase "labor's share" in the railroad dollar, they cannot increase the total payments received by railway labor—but they can *reduce* total payments received by railway labor by reducing railway revenues. Employees with sufficient seniority to hold their jobs despite a decline in traffic will, of course, "get theirs" if wages are increased.

The general observation (in the foregoing italics) needs qualification in the way of more accurate and up-to-date definitions of what constitutes railway revenues, or "the railway dollar"; and what constitutes total

Relationship Between Wage Payments and Operating Revenues

Year	(a) Operating Revenues (000)	(b) Aggregate Compensation of Employees (000)	(c) Payroll Tax (000)	(d) Total Outlay for Labor Col. (b) + Col. (c) (000)	(e) Total Railroad Taxes (Excluding Payroll Tax) (000)	(f) Effective Railway Revenue Col. (a) — Col. (e) (000)	(g) Labor's Share of Effective Railway Revenue Col. (d) ÷ Col. (f) (%)	(h) I. C. C. Ratio of Wage Payments to Operating Revenues (%)
1921	$5,516,598	$2,765,218		$2,765,218	$277,899	$5,238,699	52.78	50.13
1922	5,559,093	2,640,817		2,640,817	302,195	5,256,898	50.24	47.50
1923	6,289,580	3,004,072		3,004,072	333,034	5,956,546	50.43	47.76
1924	5,921,496	2,825,775		2,825,775	342,449	5,579,047	50.65	47.72
1925	6,122,510	2,860,600		2,860,600	360,251	5,762,259	49.64	46.72
1926	6,382,940	2,946,114		2,946,114	391,160	5,991,780	49.17	46.16
1927	6,136,300	2,910,183		2,910,183	378,025	5,758,275	50.54	47.43
1928	6,111,736	2,826,590		2,826,590	391,166	5,720,570	50.54	46.25
1929	6,279,521	2,896,566		2,896,566	398,385	5,881,136	49.25	46.13
1930	5,281,197	2,550,789		2,550,789	350,042	4,931,155	51.73	48.30
1931	4,188,343	2,094,994		2,094,994	304,149	3,884,194	53.94	50.02
1932	3,126,760	1,512,816		1,512,816	276,061	2,850,699	53.07	48.38
1933	3,095,404	1,403,841		1,403,841	251,757	2,843,647	49.37	45.35
1934	3,371,567	1,519,352		1,519,352	241,813	3,029,754	50.15	46.44
1935	3,451,929	1,643,879		1,643,879	239,441	3,212,488	51.17	47.62
1936	4,052,734	1,848,636	$65,519	1,914,155	254,234	3,798,500	50.39	45.61
1937	4,166,069	1,985,447	64,651	2,050,098	261,014	3,905,055	52.50	47.66
1938	3,565,491	1,746,141	99,156	1,845,297	241,626	3,323,865	55.52	48.97
1939	3,995,004	1,863,334	105,549	1,968,883	250,129	3,744,875	52.58	46.64
1940	4,296,601	1,964,125	116,431	2,080,556	279,964	4,016,637	51.80	45.71
1941	**5,346,700**	2,331,650	138,128	2,469,778	409,102	4,937,598	50.02	43.61
1942	7,465,823	2,932,070	171,012	3,103,082	1,027,822	6,438,001	48.20	39.27
1943	9,054,724	3,520,926	211,608	3,732,534	1,637,587	7,417,137	50.32	38.88
1944	9,436,790	3,857,957	230,950	4,088,907	1,615,093	7,821,697	52.28	40.88

compensation of employees. The figures necessary in developing such definitions are set forth in the accompanying table. The "standard" figures on the ratio between total wage payments and gross revenues are those published by the Interstate Commerce Commission for many years in its annual reports, and are shown in the last column of the table. These appear to be the figures used by Mr. Oliver in his testimony quoted above.

It will be noted that these percentages fluctuated within the range of 45-51 from 1921 to 1940 inclusive, but that, after 1940, they dropped off sharply. The range is only 6 points from 1921 to 1940, but from 1921 to 1944 it is 12 points. What happened, of course, is that taxes upon the railroads soared astronomically after 1940—and *what the railroads are forced to pay out in taxes they obviously cannot also pay out in wages.* Also, payroll taxes (for pensions and unemployment insurance) have mounted steadily since their inception in 1936. In their economic effect these payroll taxes are not genuine taxes, but are additions to wages.

Getting Dependable Figures

In the light of these two important recent developments, the operating revenues figures no longer measure the railways' "ability to pay" in the same way they did prior to 1941; and "aggregate compensation of employees" no longer fully states the expense to the railways of hiring labor. To get at dependable figures which can be fairly used for comparisons over the whole period since 1920, (1) operating revenues are shown in column (f) after all taxes but payroll taxes have been subtracted from them; and (2) total compensation of employees is shown in column (d) with the addition of payroll taxes (paid by the railroads for employees' benefit). The figure for operating revenues nowadays has to be reduced by over $1½ billion before it means what "operating revenues" used to mean, i. e., the approximate sum available to the railroads with which to pay wages, buy supplies and compensate investors.

It can scarcely be questioned that the column headed "effective railway revenue" in the accompanying table provides more useful figures for comparisons than does "operating revenue"; nor that the figures labeled "total outlay for labor" more accurately measure what employees receive, and what the railways pay for their services, than do the statistics on wages alone. The ratios shown in the column headed "labor's share in effective railway revenue" are undoubtedly more significant throughout the entire period 1921-44 than are the ratios of wages to operating revenues, especially in the years since the meaning of these two terms has so largely altered.

Furthermore, restating these ratios as shown in column (g) gives figures which are not distorted by recent developments. They show that labor has been getting just about the same proportion of the total amount that the railroads have had available to spend that it received throughout the preceding 20-year period. The seeming percentage decline in "labor's share" in the war years, suggested by the I. C. C. figures (last column in the table), is illusory; the wage-to-revenues ratio cannot be restored to the pre-war level in the I. C. C. figures so long as taxes run upwards of $1 billion.

Study of such figures does not prove that wages ought never to be increased—but it certainly does show that there is no automatic and necessary connection between increased wages and improved well-being of railway employees as a whole. The only way that wages can rise without a commensurate reduction in employment is for traffic and revenues to rise along with wages. Too frequently, what happens is the exact opposite.

For Lack of a Car—

The railways publicized widely, and quite rightly, the greatly increased ton-miles of revenue freight they were able to handle during the war in spite of the considerable reduction in freight car ownership that occurred during the years of the depression. Without taking any credit from what was a magnificent performance, a realistic attitude indicates, nevertheless, that this accomplishment was largely possible because of the heavy war products handled, which permitted the loading of freight cars to a greater average of their capacity, and also because of the large increase in the average miles hauled per loaded freight car.

In any event, records of average traffic efficiency per car in war years, whether based on ton-miles or the ratio of cars in service to carloadings, are misleading when compared to peace-time operations. The war movement of tank cars, for example, produced an abnormality which is reflected in all carloading statistics for the time when the all-rail movement of oil in large quantities was in progress.

During the war, surplus cars and cars requiring repairs were reduced to the lowest point in history. Now, however, the number of car shortages and the percentage of cars requiring repairs is increasing. As a rule, peace-time revenue freight requires a greater proportion of Class I freight cars than war-time freight, and this will result in a larger number of cars requiring repairs at all times. Surplus cars necessary to take care of country-wide distribution of freight cars, of the types and quantities required for regional and climatic variations in loadings, reached a low peace-time average of 76,600 in the fall of 1939. This number of surplus cars would not be adequate for any considerable increase with peace-time traffic greater than that of 1939.

A critical analysis of the present operations, correlated with the best estimates of the future, indicates a serious car situation. There have been numerous estimates of the amount of the national income in the coming years. The one which appears most reasonable is one of $150,000,000,000. Reducing this to a 1939 basis by taking out approximately 35 per cent of inflation leaves the prospective national income of about $110,000,000, in terms of 1939 prices.

Assuming that the curve of carloadings will follow the curve of national income and show a 40 per cent increase over 1939, the future peak weekly carloadings will be 1,161,301. Applying even the lowest ratio of cars in service to carloadings (1.634 in 1939) this would mean 1,897,565 cars necessary for handling such carloadings, plus an added 107,240 cars (40 per cent over 1939) that are necessary to be held in surplus for proper nation-wide distribution, and 100,240 cars to represent those in bad order on a 5 per cent of the total ownership basis, or a figure of total freight cars required to handle

peak carloadings in a post-war year of $150,000,000,000 income of 2,105,045 cars.

Freight cars owned by Class I railroads on January 1, 1946, amounted to 1,759,662, and the freight cars on order as of the same date amounted to 35,423, or a total of 1,796,085. Thus, on the basis of a national income of $150,000,000,000 annually, additional new cars required to handle peak carloadings would be 308,957. These figures do not take into account the fact that there are now in service about 578,000 freight cars which are now more than 25 years old; a large number of which should also be replaced.

In the light of such figures as these, the prevailing attitude on the part of some railway men of waiting to see what happens before buying cars seems short-sighted.

Attention, Managements

A large part of this issue, featuring as it does a report of the annual meeting of the American Railway Engineering Association and the specific problems of engineering and maintenance officers, may not interest all top management of the railways sufficiently to induce them to read the report in detail. There are, however, some discussions included in this report that are of definite concern to railway managements, and which are of such importance that they cannot be neglected or overlooked without jeopardizing the future of all engineering matters on the railways; and, hence, of sound and progressive railroading as a whole. These are the questions raised by the Committee on Cooperative Relations with Universities, relating specifically to the desire and ability of the railroads to interest high-grade technically-trained college graduates of character and ability in railroad careers, and of holding these men in railway service.

Summarizing the conclusions of this committee, arrived at as the result of its investigations and studies since 1941—some of which conclusions are addressed directly to railway managements—the committee points out that university officers are not inclined to provide courses of instruction in railway transportation unless the railways evidence greater interest in the placement of college-trained men in the several fields of railway transportation; that there is a trend among colleges and universities to discontinue or curtail their courses in railway transportation because of an apparent lack of interest on the part of the railways in their graduates; that other competitive branches of the transportation industry are more active than the railways in taking advantage of the possibilities attached to the employment of men who have received college training in transportation and economics; and that technically-trained young men are not now being attracted to railway service, as was true some years ago.

To those who foresee a successful future for the railway industry only if it is placed in the hands of the best-trained and otherwise most capable men available, these and other conclusions of the committee are matters of vital concern, and especially in the face of conditions which, according to Henry T. Heald, president of the Illinois Institute of Technology, speaking before the A. R. E. A. convention, indicate a severe shortage of well-trained engineering personnel for the next four years, which reliable estimates place as high as 150,000.

According to President Heald, whose address is reported in this issue, if the railways are to continue as a modern and efficient means of transportation, they present a wide range of challenging problems for engineers, whether their interests lie in management, in research or in operation, but he sees little hope that they will get the men they need unless they change their approach in regard to the matter of providing adequate opportunities for such men.

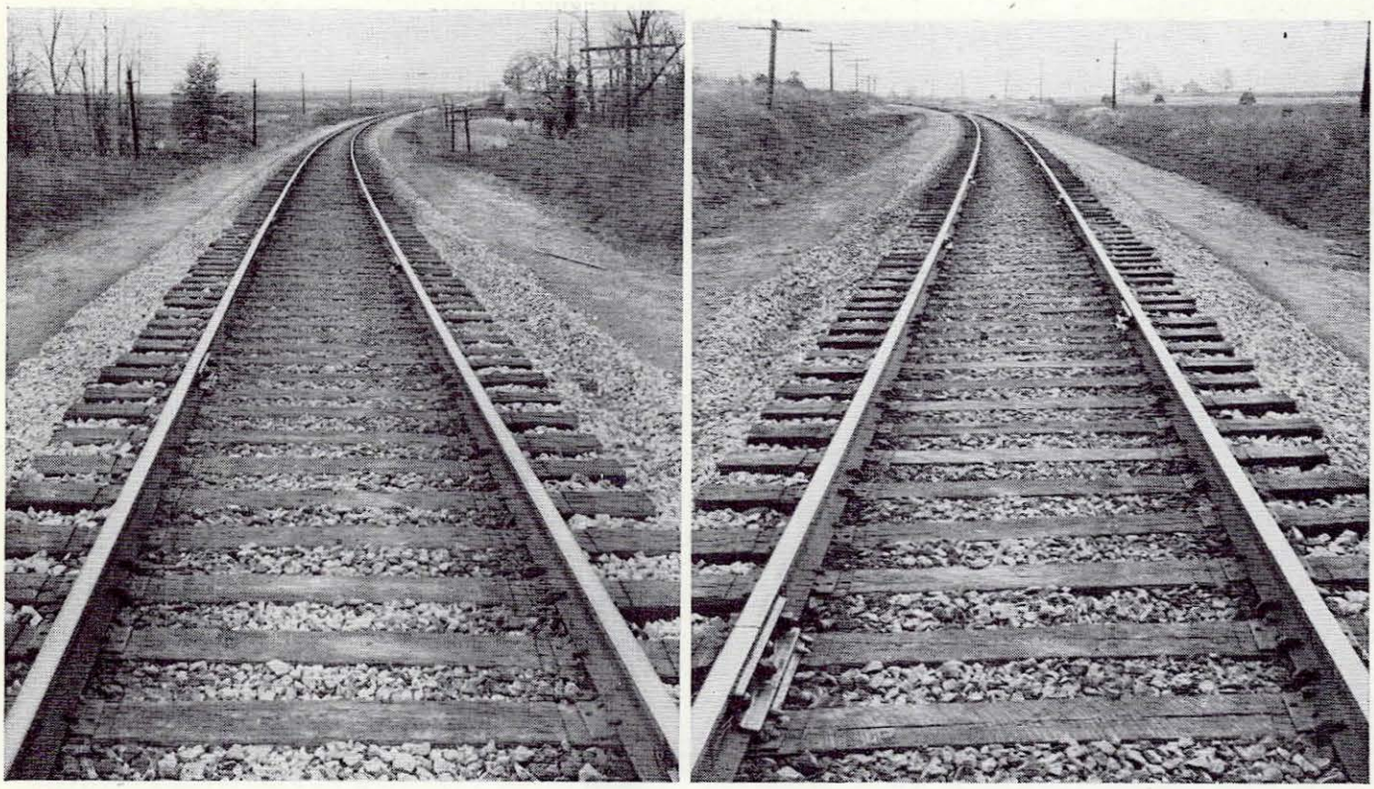
As he sees it, on the basis of past performance, the opportunities for engineering graduates in the railway industry do not look particularly bright. If this situation continues, he said, the railroads are going to be in a more and more unfavorable position in competing for the output of the engineering colleges. In bringing this matter so clearly and forcefully before the A. R. E. A. in its latest report, the Committee on Cooperative Relations with Universities has rendered an outstanding service to the railroads.

How to Make Coffee

The sound film is being used increasingly for educational and training purposes. Its adaptability for the purpose has been proved in many industries. Experience has shown that it has many uses on the railroads.

On the Missouri Pacific, for example, every town where any number of employees gather has a projection machine and a place for exhibiting sound films and they are used for a large and expanding number of purposes. Films covering rules observance and other safety factors have been in circulation for some months and have proved effective. Films now in the process of making include such subjects as dining car courtesy and how to make coffee. To the uninitiated, the latter subject might seem unimportant. Actually, an excellent cup of coffee after a good and leisurely breakfast, such as peace-time diners will provide, is a potent weapon in promoting good will among the traveling public. On the other hand, the experience of dining car men is that poor coffee will bring more complaints than any other form of improperly prepared food or beverage.

The latest film to be completed by the M. P. deals with "Booster Club" activities. These employee solicitation groups were inaugurated by L. W. Baldwin shortly after he took over the direction of the M. P. some 20 years ago, and had proved successful business getters. During the war, of course, such employee solicitation was unnecessary. The present film presents, in interesting style, a resumé of Booster activities for new employees and also serves as a refresher course for older employees. Among other things, it portrays the thought graphically that the railway plant is a mere lifeless mass of steel, timber and concrete without the skill and abilities of the employees to infuse it with life. The film also contains recorded messages from executives of the M. P., giving their reactions to the Booster activities. It ends on the note that the revival of such activities will create more jobs and warns of the competition from other forms of transportation that must be met by all-out efforts of both railway management and men.



Left—T-C vapor dried, creosoted red oak crossties after two years of service in track on the Asheville division of the Southern. Photographed October 8, 1945. Right—Air seasoned, creosoted red oak crossties, treated and installed at approximately the same time as vapor dried stock, after two years of service in track on the Asheville division of the Southern. Photographed October 8, 1945

New Process Seasons Ties Overnight

Because vapor drying relieves seasoning stresses, red oak ties show less checking than air-seasoned stock after two years in test track—Procedure also speeds pole and lumber production

PART II

NOT only has the introduction of Taylor - Colquitt's vapor drying process presented a practicable means of speeding production and treatment of crossties and other forest products, but, by reason of a unique method of relieving seasoning stresses in wood, track installations of vapor dried oak ties after two years of service also have shown an appreciable reduction in checking compared with air-seasoned stock from the same general production territory that had been treated with the same type preservative and placed in track at the same time. Of prime interest also is the fact that while regular or straight-cycle vapor drying reduces the strength of oak species slightly because of the development of a series of interior medullary slits, thereby relieving seasoning stresses, ties subjected to alternating vapor drying cycles to prevent the formation of slits and corresponding reduction in the strength of the timber are inclined to check more than straight-cycle vapor-dried ties during service but not as much as their air-seasoned counterparts.

Yellow pine poles and piles can be seasoned just as successfully as crossties and the new process holds promise as a practicable means of reducing shipping costs by eliminating a considerable proportion of moisture ordinarily left in pine poles that have been conditioned and treated by orthodox methods. Neither are the potentialities of the T-C process restricted to forest products that are to be preservatively treated, because it may be adapted advantageously for the drying of both timber and lumber.

Results of vapor drying unseasoned red oak crossties have been essentially the same in both pilot and commercial plants. Outstanding has been the reduction in the number, size and extent of seasoning checks in vapor dried ties compared with air seasoned stock. This difference is apparent as soon as the ties are removed from the treating cylinder at the conclusion of preservative treatment. Furthermore, two years of service in test track in the main line of the Asheville division of the Southern have shown that the same differential has been maintained; in fact, the con-

trast between comparative groups that were treated and subsequently inserted in track at the same time was even more marked after two years of service.

Typical of the charges of vapor dried crossties that were processed in the commercial plant are the following data on 800 red oak ties from which 32,705 lb. of water were removed prior to their being treated with 60/40 creosote-coal-tar-solution in the same cylinder:

Period of heating in vapor at 270 deg. F.	12 hr.
Vacuum period (24 in. of mercury)	2 hr.
Total water removed from charge	3,980 gal.
Total weight of water removed	32,705 lb.
Average quantity of water removed per cu. ft. of wood	11.5 lb.
Average initial moisture content of the wood	72.6 per cent
Average final moisture content of the wood	41.0 per cent
Average reduction of moisture content of the wood	31.6 per cent

A 15 Months' Job in 14 Hours

Actual records show that unseasoned red oak crossties can be conditioned for preservative treatment in *14 hours or less* by vapor seasoning compared with *15 months average minimum* time for air seasoning on Taylor-Colquitt's Spartanburg yard. Further experimental tests now nearing completion indicate that it will be possible to accomplish the drying even in a period substantially less than 14 hours. During that year and a quarter, air seasoning reduces the average moisture content from 70 per cent to about 40 per cent but the process also is accompanied by considerable checking and splitting, which is an inherent characteristic of air seasoned red oak ties.

On the other hand, vapor dried ties emerge from the treating cylinders of both pilot and commercial plants with fewer checks than air seasoned ties whose moisture content has been reduced to the same relative extent. Cross sections cut from vapor dried ties reveal small slits beginning ¼ in. or ½ in. from the surfaces, extending inward along many of the medullary rays and ranging from ¾ in. to 1½ in. in length and varying in proportion to the length of the drying period. Rarely are these slits wider than 1/16 in., nor have they been found within 2 in. of the ends of the ties.

Because of the presence of these ray-like slits, strength tests were conducted on vapor dried ties at the Southern Railway's laboratory at Alexandria, Va., and also at Clemson College, Clemson, S. C. Results revealed that vapor drying of unseasoned red oak ties at temperatures ranging from 320 deg. F. to 330 deg. F. and employing a non-polar coal tar fraction with a boiling point within that range at atmospheric pressure to reduce the average moisture content from 70 per cent to 30 per cent was accompanied by reductions in strength of approximately 15 per cent compared with unseasoned control ties. Similar conditioning reduced the strength of red and black gum ties by amounts ranging from two to eight per cent and reduced the strength of beech ties by approximately eight per cent.

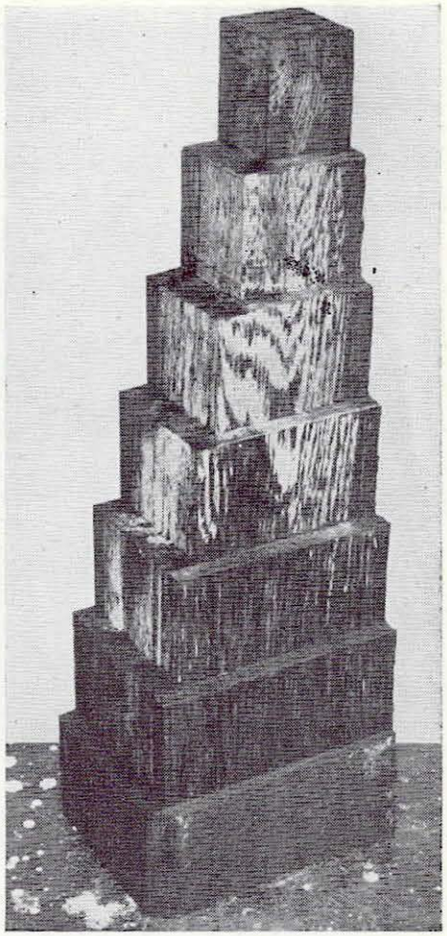
To overcome strength reduction resulting from vapor seasoning, a modification of the procedure was developed by exposing ties to alternating periods of heating vapors and vacuum instead of maintaining a prolonged heating period followed by the drawing of a final vacuum.

The use of the alternating cycle treatment maintains a more uniform moisture gradient, it eliminates the formation of small slits that characterize straight cycle conditioning and strength tests have proved that ties dried by the alternating cycle are as strong as their unseasoned controls (i. e., green ties of the same species, from the same territory and cut at the same time). Alternating-cycle vapor-dried ties were not only free from internal slits as they were removed from the cylinder but they also were as free from external or surface checks as similar ties treated by the straight cycle. Strange as it may seem, however, two years of service in test track revealed a striking difference, for while they had not checked as extensively as air seasoned ties, they had developed more checks and splits than ties that had been conditioned by the straight cycle process.

Stress-Relief Stops Checking

The fact that straight-cycle vapor dried creosoted red oak and hardwood crossties developed virtually no checks, even after two years of track service, is attributed to the development of small internal slits or checks during straight-cycle drying. These many small slits serve to equalize the stresses that otherwise develop in normal ties from swelling and shrinking of the wood during air seasoning which involves alternate periods of wetting and drying. Because the small slits developed in straight-cycle vapor drying relieve the ties of stresses, they prevent the progressive development of large localized checks and splits that usually appear in ordinary ties during service. Two-year service tests indicate that ties that have been stress-relieved by straight-cycle internal checking, despite an initial 15 per cent reduction in strength, will give better service than relatively stronger ties that have been vapor dried by alternating heating and vacuum cycles but which have not been "stress relieved."

Poles, piles, stringers and ties of southern yellow pine, Douglas fir and western hemlock have been vapor dried from a thoroughly green condition to a moisture content of approximately 30 per cent by employing the straight cycle process without incurring strength reductions greater than 5 per cent of the value of untreated controls. This conditioning was carried on in the 320 deg. F. to 350 deg. F. temperature range, and a non-polar coal tar fraction whose boiling point at atmospheric pressure is within this range was employed as the heating agent. In a recent large scale test conducted on southern pine poles it was found that vapor dried poles possessed approximately 25 per cent greater bending strength than those processed by the conventional steaming process.



A section of a 7-in. by 9-in. by 8-ft. 6-in. red oak crosstie, vapor dried by the straight cycle and treated with 60/40 creosote-coal-tar solution to 8-lb. retentions, step-cut to show penetration of the preservative

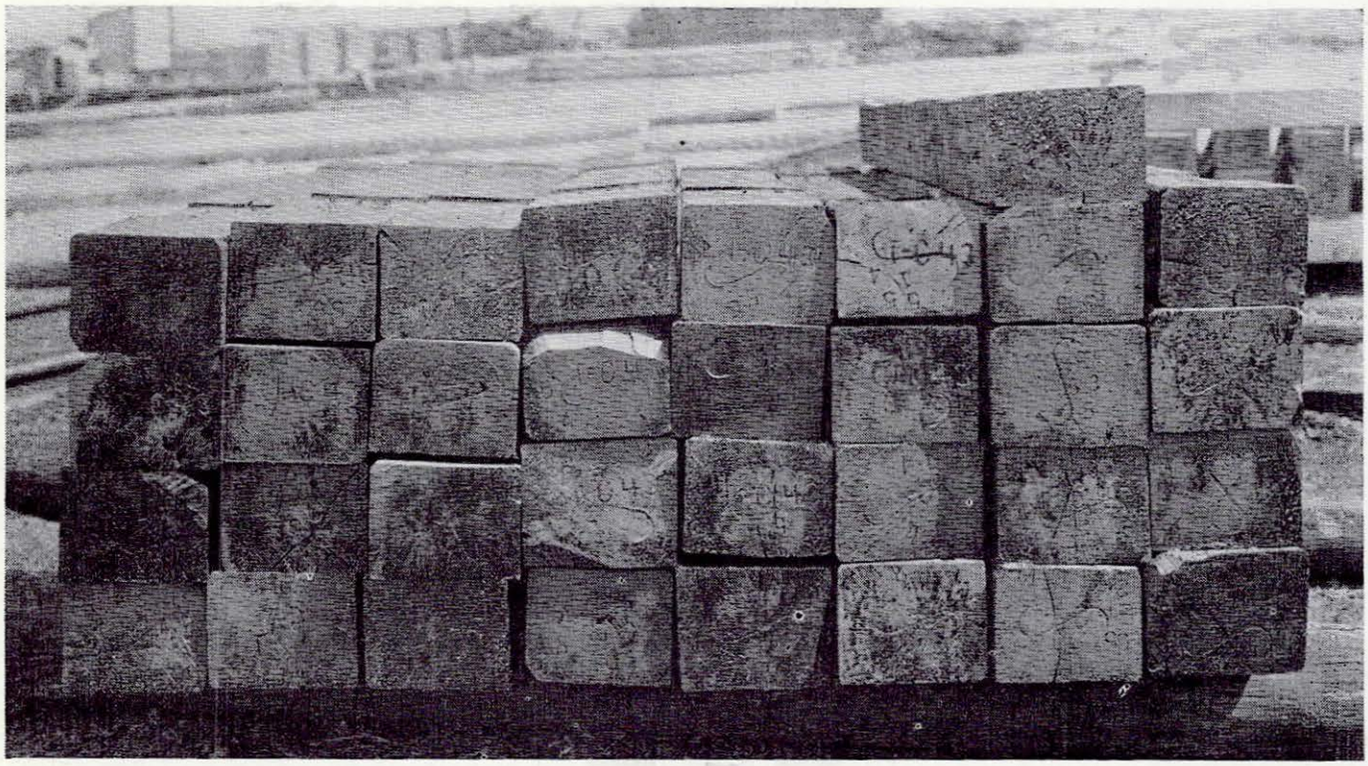
Dries Pine Poles in 8 Hours

Typical of pilot-plant results in conditioning southern pine poles is the following record of a charge of 10 poles 25 ft. long with average diameters of butt, 6.84 in.; midpoint, 5.94 in.; and top, 5.12 in.:

Drying Cycle

Heating in vapor at 330 deg. F.	6 hr.
Vacuum period, 26 in. of mercury	2 hr.
Water removed per cu. ft. of wood	15.71 lb.
Average initial moisture content of wood	91.2 per cent
Average final moisture content of wood	40.3 per cent
Average reduction of moisture content of wood	50.9 per cent

Larger poles require longer drying periods to attain similar results and a series of tests on poles with average

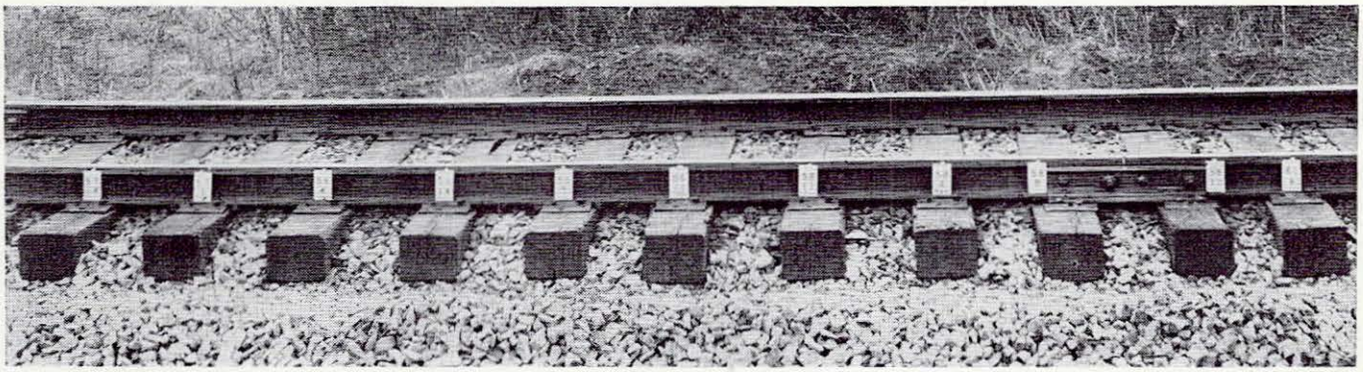


Above—A charge of T-C vapor dried, creosoted red oak crossties as they came from the pilot plant in 1943 before installation in test track on the Asheville division of the Southern

Below—A charge of air seasoned, creosoted red oak crossties treated in the pilot plant in 1943, prior to their installation in Asheville division test track. The checking is typical of red oak crossties air seasoned in the Spartanburg area

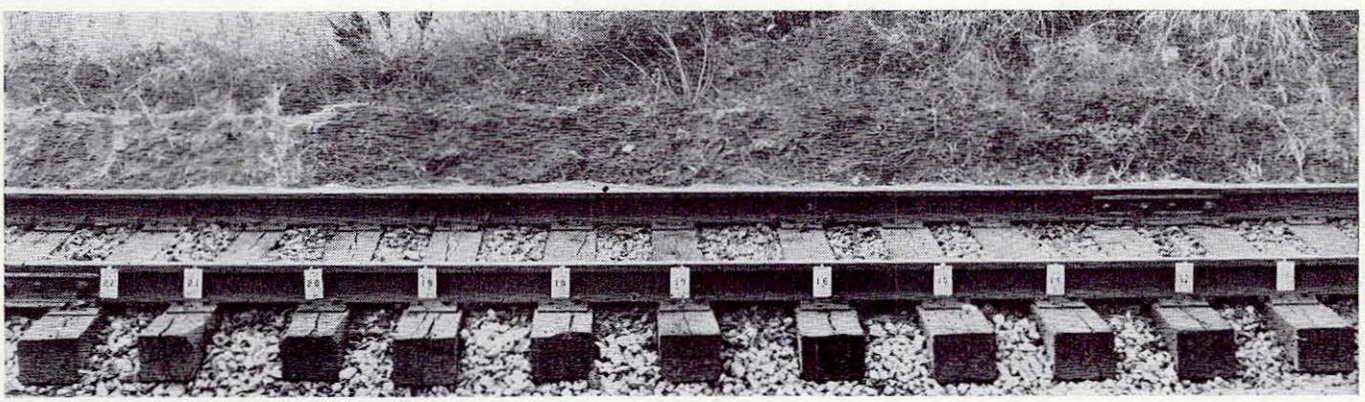
diameters ranging from 6 in. to 18 in. shows that approximately one hour's vapor heating for each inch of diameter is required to reduce the moisture content from 90 per cent to 40 per cent. The corresponding time for drying poles less than 6 in. in diameter decreases sharply with reductions in diameter and the conditioning time increases gradually for poles greater than 18 in. in cross section.

The potentialities of the T-C vapor



Above—T-C vapor dried, red oak creosoted crossties, with ballast removed from their ends, photographed on October 8, 1945, after two years service in test track on the Asheville division of the Southern

Below—Air seasoned, creosoted red oak crossties, with ballast removed from ends, photographed on October 8, 1945, after two years service in test track on Asheville division of the Southern



drying process are not necessarily confined to drying timber preparatory to preservative treatment, for the process also may be used advantageously for drying lumber. Compared to kiln-drying, the T-C process is much faster and it presents an added advantage of removing resins that otherwise are very detrimental to paint coatings. The hot organic liquids that are used in vapor drying act as solvents in removing resinous and other extractives that prevent good bonding of paint coats and which if not properly removed or treated usually "bleed" through the paint and discolor its surface.

Lumber may be dried and impregnated with preservatives simultaneously by employing certain preservatives as organic drying agents or by using other preservatives in conjunction with other drying agents. In wood preservative treatment the proper retention of preservative may be controlled by varying the intensity or the duration of the vacuum period that normally is used to recover the drying agent from the wood at the end of the drying cycle. Also, by subjecting the charge to a vacuum during vapor drying, compounds with high boiling points at atmospheric pressure may be boiled within the temperature range in which the vapor drying process has been found to be operable without injuring the wood. Compounds of this nature would be required for preservative purposes because their low volatility assures adequate retention of preservative in the lumber over long service periods.

In drying timber thicker than 2 in. to low moisture contents characteristic of kiln dried stock, it has been found necessary to modify the straight drying cycle to avoid internal checking if a non-polar drying agent is used. It has been found that if the uninterrupted or straight drying cycle for timber is continued after the moisture content has been reduced below 30 per cent (a range well below the 30 to 40 per cent optimum moisture content for preservative treatment), internal checking takes place in the wood because of shrinkage stresses that are developed by drying the outer zone of the wood far below the fiber saturation point while inner zones are still in a swollen state. By discontinuing the flow of vapor to the drying chamber at intervals and drawing a vacuum, a transfer of moisture is achieved from the wet, inner zones to the outer, dryer zones, in a manner somewhat analogous to the humidifying steps in kiln drying. The use of this alternating cycle makes it possible to reduce the moisture content of the timber to the equivalent of kiln drying without introducing internal checking.

If polar organic drying compounds are used, the straight drying cycle may be employed because such materials keep the wood swollen during the removal of the water and since the polar organic drying agent is removed so rapidly during the vacuum period that follows the drying cycle, the removal being effected by flash distillation, the gradient of the organic drying agent is not great enough to set up shrinkage stresses that would produce internal checking. Drying by the alternating cycle requires from 1¼ to 1½ times the drying period of the straight cycle.

A new automat buffet car to be put into service by the Great Western of Great Britain as soon as food conditions permit will offer passengers a quick snack. A coin in the slot will produce one of a number of varied sandwiches, salads, fruit, candy, ice cream, soft drinks complete with paper cup, and cigarets.

The letter writer will be able to drop a coin for a stamp, according to British Railways headquarters in New York; and the man with a headache or cut finger will find emergency medical supplies behind the little glass doors.

Designing Passenger Cars and Airplanes

Theory of design for the layman—An engineer pays his respects to "redundant" structures — He describes the Budd machine for testing complete car structures

By COL. E. J. W. RAGSDALE†

THE stresses of an airplane are more readily and far more accurately calculated than can be those of a railroad car. In the first place, the forces of flight and even those of landing are definitely established. We know what they are. Those of a crash have to be disregarded, for we cannot hope to design against such. Significantly enough, a "crash" becomes a "crack-up" in airplane parlance.

In railroad practice, however, it is the crash which commands attention. Operating forces are insignificant. Only when a car leaves the rails or gets into a collision does the car structure become heavily involved. Railroad speeds are so much less than those of the airplane that the passengers rarely suffer serious injuries so long as the structure remains intact. Of course, accidents know no formula and no two of them are alike but, over the years, they have assumed a certain pattern and we do know in general what to guard against.

So, while the airplane is designed by formula, the railroad car is the outgrowth of experience.

Another difference is found in the fact that airplane manufacturers are structurally conscious and will permit dispositions of strength members such as would not be tolerated in a railroad car. For instance, a once popular passenger plane had the bottom wind chord passing straight through the fuselage so that it offered a sixteen-inch hurdle across the aisle. If, on the other hand, the bolster of a railroad car raised the floor one-half inch at that point it would have to be redesigned. Railroad passenger cars are designed around the accommodation and the equipment, yet structurally they have to be sufficient.

Of course, it is hard to say just what is sufficient. People have different ideas about that, but the Association of American Railroads has set up what it considers at least a minimum practice.

The Era of "Redundancy"

It stipulates, for instance, that a passenger car should withstand a push in line of couplers up to 800,000 lb., and show 500,000 lb. in line of buffers; and it gives a 134,000 lb. loading across the end collision posts at 18 in. above the floor and a whole lot of other stuff. I shall not burden you with the details. If you are in the business, you will know them, and if you are not you will already have some idea of the magnitude of the forces involved. Mind you, they are minimum values. We at the Budd Company don't believe in building down to them and have upped them by several hundred per cent. By using a high-tensile stainless steel we can afford to do this. Our center sill, for instance, will take over 2,000,000 lb. in compression and that is the backbone of the car.

However, the car structure cannot be considered component-wise. It functions as a whole and has to be calculated as such. We have to know how the various structural members share the load, or if they do. That isn't so simple. It is almost as difficult as apportioning a rich bachelor's estate among all of the deserving relatives.

For this we use what someone with a perverted sense of humor called the "Theory of Least Work." Thank goodness it wasn't in use when I went to college. In my time we pin-jointed structures. If we didn't, we couldn't figure them. We made cat's cradle sorts of diagrams called "graphical statics" and from these we measured the forces with a tape measure. It was all very simple and somehow we got through school. Of course, we were warned that if we heavily gusseted some joint, the thing might become "redundant" and that word assumed more fearsome meaning than would the term "untouchable" to a Hindu.

In the meantime, the doctors have gotten busy. They first found out that a redundant structure can be more efficient than one which is merely pin-jointed. Worse yet, they found out how to figure this redundancy business. That is where this Least Work Theory comes in.

If you don't already know it, I do not recommend that you try to learn it. Like so many nice theories, it starts off with a disarming simplicity. It says, to begin with, that if a bridge structure deflects one inch under a 10,000-lb. load in the center, the amount of work done is 10,000 in. lb. Well! I can understand that and don't refute it, but then it goes on to say that this is the total amount of work done and therefore all of the little works which go into stretching or compressing all of the members of the bridge must eventually add up to 10,000. Next I am embarrassed by the thought that bridges don't have just 10,000 lb. loaded in the center. That load is apt to be anywhere and usually not all in one lump. So I call in the doctors. Since the Theory of Least Work is involved it takes two doctors, one Ph.D., fourteen pencils and three months. Worse yet, test will prove that they are right.

The simultaneous equations set up for determination of the side frame of a railroad coach number 47. I hesitate to venture a guess as to the equations involved in the entire car structure. My feelings and admiration can only be expressed by saying how gratified I am that there are people who love this sort of work, and who are proficient in it.

Car-Body Testing Machine

The Budd Company put up the first and the only plant in which a complete car can be tested. It can be loaded vertically. The sides can be pushed in and it can be pushed endwise to the tune of 2,000,000 lb. Some 500 SR-4 electric strain gauges and 68 Huggenberger extensometers show the stresses in every member, important or otherwise. The electric strain gauges have enormously speeded up the process of testing. All gauges are wired into a center panel and the readings are recorded as fast as the operator can push buttons. In three days we have accomplished as much work as we used to do in three months.

The testing machine is housed in a separate building. It consists of a 2,000,000-lb. Baldwin-Southwark compression machine mounted horizontally some fourteen feet above the floor. The test car—usually a skeleton structure—is rolled in over tracks on the ground floor and onto a lift table. This is then raised to any desired point of load application. Two 10½-in. round tension rods pass to either side of the car and connect to a

A paper presented before the Southern Ohio section of the Society of Automtive Engineers, February 13, 1946.

† Colonel Ragsdale was chief engineer, railway division, Edw. G. Budd Manufacturing Co., Philadelphia, Pa., at the time of his death on February 24.

reaction head some 90 ft. away; lengthwise, a 90-ft. car can be tested. The tension rods are jointed so that even a 2-ft. specimen can be compressed.

Both compression and reaction heads may be moved sidewise so that diagonal loading becomes possible. All loadings, however, have to be on a horizontal plane.

Vertical loading of the car is accomplished by having a series of hydraulic jacks mounted on the floor of the car and connected by straps to the tracks beneath. These are all manifolded to a common pressure system. Then side loadings are made by securing these same jacks to certain columns of the building. In neither case are the loads anywhere near as great as are those of end compression. The live load of a passenger car rarely exceeds 10,000 lb.

A modern, lightweight coach weighs some 112,000 lb. This weight divides almost equally into one-third body, one-third trucks and one-third equipment and appointments. There is no use trying to compare this with the older conventional coaches of 150,000 lb., because the newer equipment carries so much more equipment. Indicative of this is the fact that the older coach had a 7½-kw. axle generator, while railroad engineers are now talking 32 kw.

The choice of material naturally influences design. Aluminum with its greater bulk, and hence greater plate stability, naturally favors a skin-stressed structure. The low alloys of steel are mostly used in a skin-stressed structure, too, but one in which the sheathing is frequently stabilized by attached stiffeners. Stainless steel, with its much greater tensile strength, is best utilized in a truss system of side framing.

My own company has favored the use of stainless steel ever since the beginning of the lightweight movement. It has many advantages aside from the obvious one of corrosion resistance. Its use, however, did involve a new philosophy of design. Of course, the effective use of any very high-tensile steel would do this. The problem is one of thinness and how to make it effective in compression or in panels. Very few members are ever in pure tension. A bicycle spoke is the only one I can think of at the moment but we don't use any of these in car construction.

The Stainless Structure

Accordingly, the Budd cars differ radically from all others in structural design. To begin with, the roof becomes a principal structural member, not only when considering the car as a beam but also in end compressive loadings. It is not merely an umbrella to keep the weather out. It takes over one-third of the total bending moment of the car, and yet the metal used is about the thickness —or shall I say the thinness—of a calling card. It is a real compression member and so it should be. The roof has the greatest expanse of any member in the car. It is furthest removed from the neutral axis. And, furthermore, the roof has to be walked on. So we simply take a lesson from the paper-box manufacturers and corrugate this thin sheathing fore and aft. In addition, two heavy stringers run the full length of the roof from end collision post to end collision post. They not only contribute towards giving an end compressive strength four or five times that required by the Association of American Railroads, but they act as efficient guard rails in case of an accident which might otherwise invade the roof.

So the roof becomes the upper chord of the beam. It is tied into the lower chord, which is the floor system, by the side frames. These would be quite simple members if it were not for a railroad prejudice against triangular windows. Otherwise we could use a Pratt Truss as they do for freight cars. Instead we have to use a modification which is technically known as a Vierendeel Truss. The diagonal ties into the vertical post about half way up and I don't have to tell you what you can look out for in the corner of the window opening. It doesn't matter whether you use a skin stressed construction or a truss—there can be trouble there. We mitigate the condition by running a strong lower window rail from one end of the car to the other. This, too, serves a dual purpose in guarding against structural invasion by sideswiping.

Of course, this type of framing throws a queer combination of compression, shear and bending into the side post just above the lower line of the windows. The good old Theory of Least Work does a job here, but we supplement it by use of plastic models and thereby determine the point of contraflexure in the vertical post somewhere between the window ledge and the roof. The doctors love that point of contraflexure. It becomes somewhat of a datum line or neutral axis or starting point from which even more complicated formulas can be evolved.

Finally, we come to the floor system or underframe. There is plenty of heft in that. It has to stand abuse as well as use. We have to be able to stamp on it. All sorts of equipment has to be hung from it. Adjacent cars ram hell out of it, and almost anything can happen to it, but it mustn't ever fail. It has more obligations than the double bottom of a ship.

Part of the underframe is the side sill, one on either side, but this is more properly speaking part of the side frame. The two side sills are tied together by the floor beams. In our latest construction these consist of channels 4½ in. deep running laterally and all welded together to form a continuous underflooring—just like so much planking on a bridge —only the channels face upward and are closed by a plywood flooring.

In the middle of the car the floor channels are welded to a center sill. This is really the backbone of the car, and eventually it ties into the draft gear and couplers. The A. A. R. lays great stress upon the value of this member. It stipulates a minimum compressive value of 800,000 lb. We at the Budd Company go considerably above this. In fact, we exceed 2,000,000 lb. With stainless steel we can do this with no increase of weight.

Side sills and the center sill have other values, too. We can hang stuff on them and that is getting to be more important all the time. In fact, it is almost a question whether we are designing cars nowadays for the passenger or for more equipment. You may find a vacant seat or an empty berth some day, but I defy you to find an empty cubic foot of space under the car or in the roof. Batteries are one big problem. They weigh some 7,000 lb., including the box. That alone is two-thirds of the passenger load, including baggage. Air conditioning and the electrical installation account for another 8,000 lb. Water weighs a ton. If you wanted to ship that water by freight, it would cost you just about as much as the child you take with you at half fare. Speaking of tons, a fully loaded coach—and they sure are fully loaded today—carries a ton of weight for every passenger carried. The average tariff per ton mile in freight is about one cent. So the railroad collects two cents a mile from you and donates one cent of it back to hauling the equipment which it supplies for your benefit.

Dark Outlook for Better Ride

So far I have talked chiefly of the car structure and, as I have said, it constitutes about one-third of the total car weight. The trucks account for another one-third and they are blamed for a lot of the deficiencies of riding comfort. I wish I could picture a better time to come. Actually we are trying to provide such, but you are not going to enjoy it immediately. I don't know that you ever will. The most progress which we have made is to design a truck which requires less maintenance. You have possibly noticed that often a car rides beautifully, and again a car of the same type will be nothing but a torment. This is purely a matter of truck maintenance. Today there is no time nor skill to maintain trucks. Maybe—like courtesy—they will eventually return to us.

Actually the average passenger cannot distinguish between the discomforts of motion and that of noise. That is something which we can do something

about, and will, and a thing which does not depend upon a continuous maintenance. Once it is built it will stay there. Noises are those of loose parts which can be corrected, and the airborne noises which can be dampened. Among the latter is the sound of the rails. Any boy will tell you how he can clamp his ear to a rail and hear a train half a mile away. Well, under each coach there are 170 ft. of rail. How much must they be singing as the car passes over them?

Brake screeching is another source of annoyance. You wouldn't allow it in your automobile. You don't like it when a few rivets which hold the lining happen to get in contact with the brake drum, and yet railroad cars since time immemorial have been stopped by a metal shoe applied against a metal rim of the wheel.

And, we have tried to do something about that. The Budd Wheel Company has designed an automotive type of braking for railroad cars. So far about 200 cars have been equipped with it. They not only brake smoother, but they brake in shorter distance and especially from the higher speeds.

But, as I have said before, railroad cars are built around the appointments. We do have to have windows where they belong according to the passengers, and if the water cooler interferes with a structural member it is the structure and not the water cooler which goes out. After all, the purpose of all new equipment is to attract and to keep the trade. If we have to build a pent-house into a structural roof, well, that is only another engineering headache, but if it keeps the passenger happy, it is well worth while and aspirin doesn't cost very much. After all, if everybody stayed put and we had no changes, engineers wouldn't be well fed nor happy.

Then as for the railroads, they, too, have a job to do. They have got to learn that travel is a commodity and has to be merchandised as such. They had better forget the airways and the highways as competition and figure them in as just part of the general travel picture. They had better concede that the airways can offer speed and that the bus will always be cheaper. In fact, the railroads should stick to their knitting. Actually they have a very strong argument. They can offer a thoroughly relaxed travel and not the least feature of this relaxation is the feeling of being perfectly safe, for, according to the American Safety Council, you are sixteen times safer on a railroad train than you are on the highway in your own automobile, or in a commercial airplane.

I haven't the figures as to where you would rate in your own bathtub.

COMMUNICATION *and* BOOK

Relation of Boiler Capacity to Firing Rate

WASHINGTON, D. C.

TO THE EDITOR:

I have been much interested in Ralph P. Johnson's New York Railroad Club paper, reported in the *Railway Age* of May 26, 1945, dealing with the test performance of the Pennsylvania T-1 class locomotive, in your editorial appearing in the June 2 issue and in the further communications appearing in the June 30 issue commenting on the limit of locomotive boiler capacity.

Mr. Johnson shows the efficiency of the boiler of this T-1 locomotive to follow a straight-line relationship to the coal fired in lb. per sq. ft. of grate per hour. For such a straight-line efficiency the maximum boiler capacity can readily be shown to occur at a definite firing rate and efficiency as follows.

The efficiency being represented by a straight line, its equation in terms of rectangular coordinates may be stated thus:

Efficiency (in decimals) $= e = a - bx$

in which a and b are known constants as determined from any two points on the straight line, and x is the coal burned in lb. per sq. ft. of grate per hour. The total heat absorbed by the boiler in B. t. u. per hour, therefore, is equal to

$$C\,(a - bx)\,Ax$$

where C equals B. t. u. per pound of coal and A equals the grate area in square feet.

As C and A are constants, this is a maximum for $(a - bx)\,x$ maximum, or for

$$ax - bx^2 \text{ maximum}$$

In terms of differential calculus, this is a maximum when its differential with respect to x equals zero, or

$$a - 2bx = 0$$

from which

$$x = \frac{a}{2b} \text{ for maximum heat absorption}$$

and

$$e = a - \frac{ba}{2b} = \frac{a}{2}$$

for maximum heat absorption

In the Pennsylvania T-1 class locomotive test with a boiler efficiency of 65.5 per cent at 50 lb. of dry coal per sq. ft. of grate area per hour and 43 per cent at 240 lb. per sq. ft. of grate per hour, the equation of boiler efficiency becomes:

$$e = .7142 - .001184\,x$$

from which for maximum heat absorption, or boiler capacity,

$$x = \frac{.7142}{.002368} = 301.60 \text{ lb. of coal per sq. ft. of grate per hr}$$

and

$$e = .3571, \text{ or } 35.71 \text{ per cent}$$

The percentage of heat absorption at the firing rate of 240 lb. of coal per square foot of grate per hour as compared to the maximum possible at the above rate was thus:

$$\frac{.4300 \times 240 \times 100}{.3571 \times 301.60} = 95.82$$

In other words, it appears that at the 240-lb. firing rate the boiler was operating, from a heat absorption standpoint, to within 4.18 per cent of its maximum capacity.

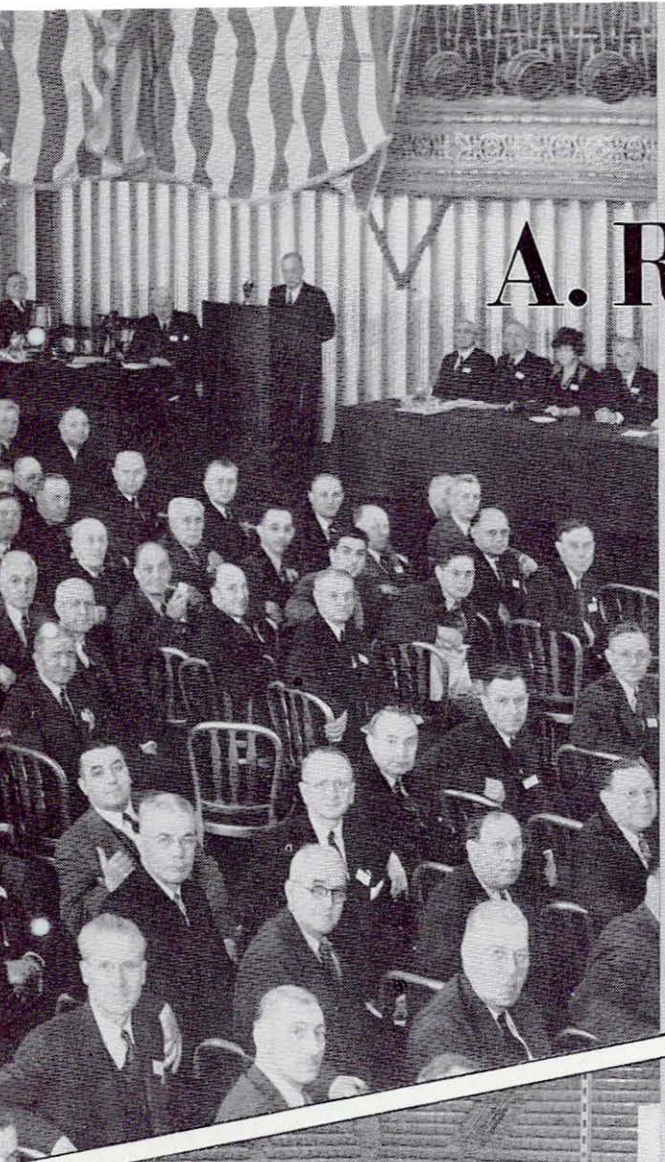
Assuming that the total B. t. u. per lb. of steam minus the B. t. u. furnished by the feedwater heater per lb. of steam or the B. t. u. per pound of steam as furnished by the coal were constant, the capacity in terms of steam output in lb. per hour as tested at the 240-lb. rate was also within the same percentage of total capacity as the above. It is understood that the boiler was actually tested at a 242.7-lb. coal rate, which would mean on this basis to within (100 — 96.19) or 3.81 per cent of its maximum capacity.

J. H. HARRISON,
Mechanical Engineer, Southern Railway System.

Rebuilding the European Transportation System, by Gustav Pollaczek. Pamphlet, 6 in. by 9 in., 54 pages, No. 5 in "Studies in Post-War Reconstruction" by the American Labor Conference on International Affairs, 9 East Forty-sixth street, New York 17.

The board of directors of the institution which sponsors this study includes G. M. Harrison of the railway clerks' organization, and D. B. Robertson of the Brotherhood of Locomotive Firemen & Enginemen. The author's principal thesis is that the reconstruction of Europe's transportation system, which he assumes will be carried out primarily by the allies, will be both more economical and more effective if it is preceded by a careful study of the continent's actual transportation needs. He asserts that prior to the war there was a considerable surplus of transportation and duplication of facilities by the various modes of transportation, and that in many instances uneconomical railroads were subsidized and aided by prejudicial legislation for nationalistic reasons.

Dr. Pollaczek urges that a postwar recurrence of this uneconomical situation be avoided by rebuilding Europe's transportation system with a due regard for demand and supply, refraining from unnecessary duplication of facilities, and by encouraging progressive international transportation agreements among the European nations so that traffic will be encouraged to move by the most economical means possible.

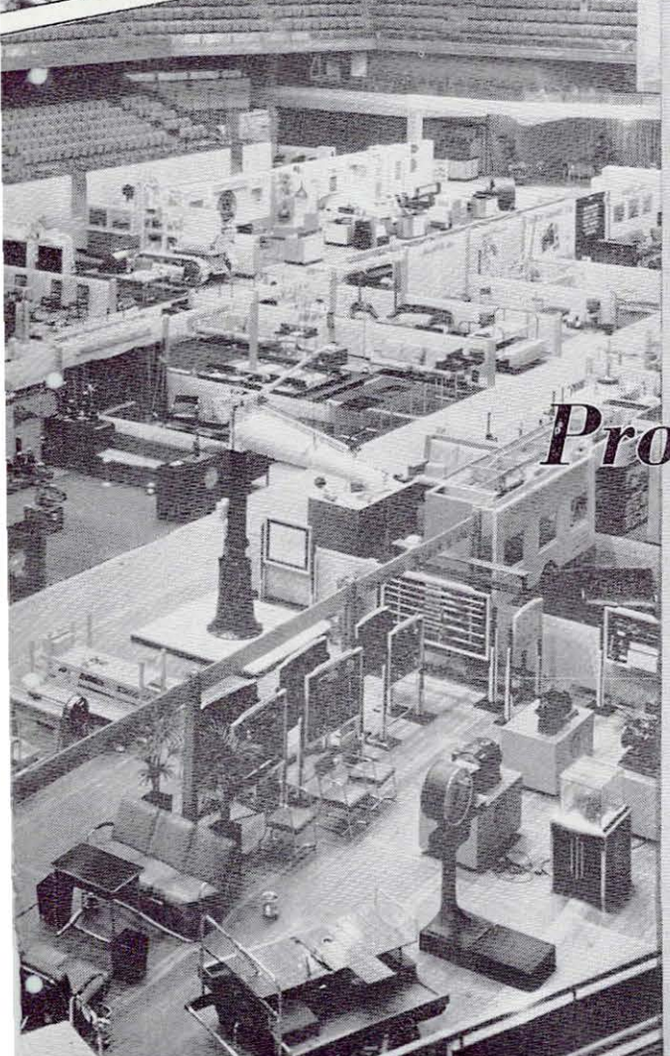


A. R. E. A.

Convention Section

Contents

This section contains a complete account of the convention held at Chicago on March 12-14, including abstracts of all addresses and committee reports presented, along with pertinent comments from the floor. Also included are statements by the president and the secretary of the National Railway Appliances Association, and a comprehensive exhibit in print of new and improved products applicable to railway construction and maintenance work.



Products

Exhibit in Print

Engineering Officers Consider Many

A. A. Miller
President

J. B. Akers
President-elect

Walter S. Lacher
Secretary

WITH eyes turned resolutely and with confidence to the future and the many difficult problems it is expected to bring, engineering and maintenance officers of the United States and Canada held a three-day meeting in Chicago on March 12-14, under the auspices of the American Railway Engineering Association. This meeting, which was the forty-fifth annual convention of the A. R. E. A., was endowed with special significance for at least two reasons: (1) It marked the resumption of the practice of holding annual meetings, which was interrupted twice during the war, first in 1943 and again in 1945; and (2) it constituted, for the A. R. E. A. and its members, the final step in transition from war to peace, with the emphasis now altogether on those problems and matters which, from an engineering viewpoint, are demanding attention in the interest of strengthening the competitive position of the railroads in the transport field.

Honors Bestowed

In broad outline, the pattern of the meeting was similar to that of previous peace-time years, with the first session being held on Tuesday morning, March 12, and the final session on Thursday morning, March 14. A considerable part of all the regular sessions was given over to the presentation and discussion of the reports of the association's standing committees. These included reports by 19 committees on a total of 86 subjects covering a broad range of problems encountered in designing, constructing and maintaining railway tracks, bridges, buildings and water service facilities. Frequently throughout the convention the commitee reports were interspersed with addresses on a variety of subjects claiming particular attention at this time, there being at least one address presented during each session of the meeting.

Notwithstanding their preoccupation with the many matters of technical interest on the program, the group found time during the first session to present honorary memberships in the association to two railroad engineers who have attained outstanding eminence in the field. These were Ralph Budd, president, Burlington Lines, and J. M. R. Fairbairn, retired chief engineer, Canadian Pacific. Since Mr. Budd could not be present, the honorary membership was accepted on his behalf by Edward Flynn, executive vice-president, Burlington Lines.

The first item on the program of the morning session on Tuesday was the address of A. A. Miller, president of the A. R. E. A. and chief engineer maintenance of way and structures, Missouri Pacific, which was followed by the annual reports of the secretary and of the treasurer. In his report, Walter S. Lacher, secretary, noted that both the revenues and expenses of the association increased during 1945, with receipts exceeding disbursements by $2,936.33; that there was an increase of 103 in the membership, bringing the total to 2,107; and that the committees had submitted a total of 545 pages of reports compared with 753 pages in the previous year, "a reflection of the limitations on committee work imposed by war and postwar conditions."

Johnston Speaks Out

The voice of management was heard at the convention in the form of an address during the opening session by C. E. Johnston, chairman, Western Association of Railway Executives. Mr. Johnston indulged in some plain talk regarding the present trend of thinking and events in the United States, saying that "we are a bewildered, confused people today—grasping at straws." Deploring the activities of "troublemakers, reformers, brain trusters, parlor pinks, demagogues, bigots, and purveyors of foreign ideologies," he said that they have "organized discontent, unrest, ignorance and selfishness to a degree of effectiveness that is, at long last, beginning to alert all red-blooded Americans." The result, he said, is that a deplorable situation is now confronting all industries, including the railroads, and that "we had better bestir ourselves and bring some good sound thinking and aggressive action to bear on this situation before it is too late."

The morning session on Tuesday was

Resume Annual Meetings—Problems at Chicago

Turn attention to the peace-time needs of the fixed properties in the face of pressing demands for better service and maximum efficiency in maintenance and operations

characterized by two other addresses. E. W. Reich, chairman, Signal section, Association of American Railroads, and superintendent telegraph and signals of the Reading, brought the group up to date regarding the activties of the signal men, and the same function was performed on behalf of the Electrical section, A. A. R., by J. M. Trissal, chairman of that section, and superintendent of communications and electrical engineer of the Illinois Central.

The other technical addresses that were presented during the regular sessions of the convention were concerned with some of the more pressing problems confronting railway engineering officers today. One of these problems is that of finding ways to induce college-trained men to enter railroad service, which was discussed in an address during the Tuesday afternoon session by Henry T. Heald, president, Illinois Institute of Technology. During the same session the problem of minimizing accidents at highway crossings and those due to trespassing was discussed by J. R. Tenney, chairman, Committee on Highway Crossings, Safety section, A. A. R., and superintendent of safety, Western Maryland.

In recognition of recent developments in the field of roadbed stabilization, and of the increasing importance of imparting a high degree of stability to railroad subgrades, the program of the morning session on Wednesday included an address on Soil Mechanics as Applied to Railroad Roadbeds, by Professor Ralph B. Peck, research assistant professor of soil mechanics, University of Illinois. Similarly, the increasing application of welding in the fabrication of metal structures, and the need thereby created for more information on the properties of structural members repaired or strengthened by welding, were reflected in an address during the morning session on Thursday by Professor W. M. Wilson, University of Illinois.

Lessons from Mexico

Two other addresses were heard by those attending the convention. On Tuesday evening the group joined with the Transportation Engineering section of the Western Society of Engineers in a meeting which was featured by an address, entitled "Lessons We Can Learn From the Government-Owned Railways of Mexico," by O. M. Stevens, president and general manager, American Refrigerator Transit Company, and formerly chief, United States Railway Mission to Mexico. As a result of his studies of the railway situation in Mexico, Mr. Stevens was able to give a first-hand account of what can happen to the railroads of a country, and to its economy as a whole, when the railroads are nationalized on a socialistic basis.

The other address was heard at the annual luncheon of the association, held on Wednesday noon. With war-time experiences still fresh in mind, this address was particularly timely because it dealt with the functions and indispensability of the railroads during periods of conflict, with particular reference to the duties and responsibilities of railway engineering and maintenance officers. The speaker was Brigadier-General Donald Armstrong, commandant, Army Industrial College, Washington, D. C.

All the regular sessions of the convention were presided over by President Miller, assisted by Vice-president J. B. Akers, chief engineer, Southern, and Secretary Lacher. The registration at the meeting was 723 members and 614 guests, a total of 1,337, compared with a registration of 612 members and 527 guests, a total of 1139, at the last annual meeting of the association in 1944.

Akers Elected President

The following officers were elected to direct the affairs of the association during the ensuing year: President, J. B. Akers, chief engineer, Southern, Washington, D. C.; vice president to serve two years, Armstrong Chinn, executive officer, Alton, Chicago; Directors: C. H. Blackman, chief engineer, L. & N., Louisville, Ky.; S. E. Armstrong, engineer maintenance of way, New York Central System, New York;

Board of Direction, A.R.E.A.

President

A. A. Miller, chief engineer maintenance of way and structures, M. P., St. Louis, Mo.

Vice-Presidents

J. B. Akers, chief engineer, Southern, Washington, D. C.
C. J. Geyer, general manager, C. & O., Richmond, Va.

Past-Presidents

A. R. Wilson, engineer bridges and buildings, P. R. R., Philadelphia, Pa.
F. E. Morrow, chief engineer, C. & W. I.—Belt Railway of Chicago, Chicago.
E. M. Hastings, chief engineer, R. F. & P., Richmond, Va.
H. R. Clarke, chief engineer, Burlington Lines, Chicago.
F. R. Layng, chief engineer, B. & L. E., Greenville, Pa.

Directors

G. L. Sitton, assistant chief engineer, Southern, Washington, D. C.
C. E. Smith, vice-president, N. Y. N. H. & H., New Haven, Conn.
R. A. Van Ness, bridge engineer system, A. T. & S. F., Chicago.
W. H. Penfield, chief engineer (retired), C. M. St. P. & P., Chicago.
C. H. Mottier, vice-president and chief engineer, I. C., Chicago.
J. E. Teal, transportation engineer, C. & O., Richmond, Va.
F. E. Bates, executive assistant, Missouri Pacific, St. Louis, Mo.
G. A. Haggander, assistant chief engineer, Burlington Lines, Chicago.
R. E. Rougherty, vice-president, New York Central System, New York

Treasurer

J. D. Moffat, chief engineer, Western region, P. R. R., Chicago

Secretary

W. S. Lacher, 59 East Van Buren Street, Chicago

Assistant Secretary

Frank McNellis, 59 East Van Buren Street, Chicago

and J. S. McBride, chief engineer, C. & E. I., Chicago; members of nominating committee: R. P. Hart, chief engineer, M. P., St. Louis; T. A. Blair, assistant chief engineer system Santa Fe, Chicago; L. T. Nuckols, chief engineer, C. & O., Richmond, Va.; L. L. Adams, assistant chief engineer, L. & N., Louisville, Ky. and W. D. Simpson, chief engineer, Seaboard, Norfolk, Va. In addition, C. J. Geyer, general manager, Chesapeake & Ohio, and vice-president of the association, was advanced automatically to senior vice-president, succeeding Mr. Akers.

Because of various considerations, including the unsettled conditions prevailing in industry generally, the convention was not accompanied as in past years by an exhibit by the National Railway Appliances Association.

In the following are presented abstracts of the addresses by President Miller and by Messrs. Reich, Trissal, Heald, Tenney, Wilson, Stevens and Gen. Armstrong. More complete abstracts of the addresses by Mr. Stevens and by Gen. Armstrong, will be presented in later issues. Also included, are a statement by President-elect Akers and abstracts of all the committee reports, along with the discussion and action which followed their presentation.

President's Address

At the outset of his address opening the convention, President Miller referred to the trials imposed on the association and its members by the war, but added that "there are no places weakened that cannot be strengthened; no procedure slackened that cannot be restored; no progress retarded that cannot be accelerated." In a brief accounting of the affairs of the association during the past year, he pointed out that membership in the association had increased at a more rapid rate than in any other recent year, and that as a result of a considerable excess of revenues over expenditures the finances of the association are in a sound condition.

Referring to the fact that the reports presented this year cover the smallest number of printed pages in a considerable period and that of the pages printed a highly important part represents the work of the research staff, President Miller cited the latter aspect of the situation as a significant development, indicating a trend in the strengthening of the work of the committes. He also stated that there has been a decline in the number of committee members actually participating in the work; that there have been fewer young men identified with the work of the committees; and that fewer committee meetings were held during the year. But these trends, he pointed out, were the result of war-time conditions, and said that developments inherent in the coming of peace should soon bring about a "marked improvement in the conditions that have militated against effective committee work." To enhance the natural course of events, he recommended that the association "institute a complete reappraisal of our methods and procedures to make certain and positive that we are proceeding along lines that will produce the most valuable and beneficial results. * * *."

The Research Program

President Miller then discussed at some length the effect of the association's broadened program of research on the work of its committees. The thought has arisen on occasions, he said, as to whether the matters pertaining to research are outmoding or replacing committee work in the sense that the term has been and is commonly understood. Rather than having this effect, he said, research work constitutes a necessary aid in supplementing and strengthening the work of several of the committees. The function of committees, he asserted, is one of "synthesis, co-ordination and simplification in applying to their work the results of scientific investigation, statistical data and accumulated practical experience, as the case may be, depending on the nature of the work involved or the problem presented and under consideration."

Stating that the granting of funds for research work imposes a serious responsibility on the association, the president emphasized the necessity of keeping constantly to the fore the real objective of each of the research projects—namely, "to find an answer to some pressing problem that can be applied in a practical way in the interest of better, safer or cheaper railway transportation—and that for this reason "we must review our efforts frequently to be sure that the progress being made offers definite promise of beneficial results." On occasion, he said, if the situation demands, it is far beter to admit failure than "to proceed aimlessly in the hope that 'something may turn up'." Emphasizing the importance of the Manual as the "voice of the association," President Miller urged that it be kept up to date and free of inconsistencies, and that it reflect a knowledge of the current standards of other scientific bodies.

Turning his attenion briefly to the war-time accomplishments of the association's members, he said: "It must be a source of greatest satisfaction and most profound gratitude to you—as it is to me—to know that, during one of the greatest conflicts in the annals of human experience, we have carried on so well; whatever has been accomplished during the past year has been primarily due to the splendid co-operation of the members and supporters of the association, to their devotion to work and their duties, and to their unselfish loyalty to the ideals and purposes of the association under the most trying and adverse conditions."

How a Railroad System Was Ruined

The address by Mr. Stevens at the Tuesday evening joint meeing of the Western Society of Engineers and the A.R.E.A. was a crusading speech against the dangers inherent in the socialization of industry, especially railroads, particularly if industry is at the same time placed in the hands of the labor unions. Mr. Stevens' opinions in this regard were crystallized during the two war years that he spent in Mexico as chief of the United States Railway Mission to Mexico. Of that experience, he said, "it took me into a seething hotbed of socialism and communism", on the large railroad system of Mexico, "a railroad owned by the government but completely in the hands of the railroad labor unions".

At some length Mr. Stevens traced the pattern by which he said freedom is destroyed when labor gains complete control of an industry or a government, after which the inevitable result is that labor itself is destroyed or rendered impotent. In other words, he said, "as labor presses for socialization of industry, it signs its own ultimate death warrant". Recalling how this pattern could be observed in Germany, in Italy, in Russia, and now in Great Britain, he added that "one would have to be deaf and dumb indeed, and totally blind, not to see the same identical pattern taking shape (in our own country) before our very eyes".

Describing the growth of communistic beliefs among the employees of the Mexican railroads since these railroads were placed in the hands of the unions, Mr. Stevens said that for two years he "looked these foreign ideologies, communism and socialism, squarely in the face and found them just two manifestations of the same thing, just the opposite sides of the same lead nickel. I saw their work in the utter ruin of a potentially great railroad system, a system which in Mexico, a land of little other means of transport, is the very veins and arteries of national life. I saw their paralyzing effect upon industry and upon the whole economy of a great nation".

Speaking of his hesitancy to talk so frankly of events in a neighboring friendly country, Mr. Stevens said that this hesitancy had been overcome by his fear that the same thing would happen here, leading him to tell the story "in an effort to warn our people—all our people, including labor—perhaps labor most of all".

He then traced the history and growth of the railways of Mexico, showing how they had been heavily damaged during the revolution of 1910-14, and that afterward they were expropriated by the federal government, eventually to be placed entirely in the hands of organized labor. They were literally "given to the unions—lock, stock and barrel—for management and operation". Pointing out that every man and officer on the railroads belong to the same union, Mr. Stevens asserted that "nothing more is needed to show the utter impossibility of having a functioning, efficient, disciplined organization". The number of employees on the lines has increased, he said, until there are now 56,000 employees on a system of 8,000 miles of lines having a traffic density less than one-fifth that of any comparable United States railroad. In my judgment, he said, "there are not less than 30,000 *too many* employees" on the payrolls of this property.

Turning to the matter of operation, Mr. Stevens quoted from an article written by

a Mexican businessman citing specific instances of how a total breakdown of railroad operating efficiency in Mexico was strangling the economic life of the country. "The plain fact is", said the article, "all modern industry in Mexico is dying for lack of transportation".

Mr. Stevens went to considerable length to emphasize the fact that he is entirely in sympathy with the legitimate aims of labor unions, pointing out that he was a railroad union member in his earlier years, and that his father was a union member all his life. He has "the utmost sympathy and kindly feeling" for the rank and file of the Mexican labor unions and expressed the wish that they and their countrymen could "see how very simple and easy it would be for Mexico to have strong and modern railroads". Maybe some day they will see the truth of this, he said, and "when they do their first step will be to denounce and renounce forever the communistic union leadership which keeps them blind".

Railroads Vital

Speaking before the annual luncheon on Wednesday, Brig. Gen. Armstrong paid tribute to the railways, and especially to engineering and maintenance officers, for their part in the recent war, laid the defeat of Germany largely to the collapse of its railroads under air bombardment, and, reflecting the conviction of army officers charged with keeping our country prepared for any national emergency, called upon the railroads to keep themselves fit, as fundamental to national preparedness. He said in part:

"The effective mobilization of our national economic resources depends on efficient transportation systems. Whatever you gentlemen of the railway industry accomplish in increasing the efficiency of railroad operation, and in maintaining the railroads at all times with a reasonable factor of safety to undertake the vastly increased demands of a national emergency, will be instrumental not only in winning a war if it comes, but, better still, will help to prevent war. A deteriorated national railway system would be an invitation to an aggressor to strike this country with some hope of success.

"The thought I leave with you is that upon the outbreak of war, the railroads should be operating at maximum efficiency. The conclusion is evident — maintenance men have greater responsibility than they have ever had before for keeping the railroads strong and efficient at all times; management must never allow maintenance to be neglected, because if that occurs, the security—perhaps the very existence—of our nation is jeopardized."

College Men and the Railroads

The major portion of Prof. Heald's address on Some Modern Developments in Engineering Education was devoted to a discussion of some of the broader aspects of this problem, including the effect of war-time conditions on the colleges and their ability to meet the present-day need for higher education; the responsibility of higher education to the public, to industry and to the professions; and modern trends in engineering curricula. Then, couching his remarks in frank terms, he focused his attention on the implications of the situation for the railroads, speaking in part as follows:

"The railroad industry, in common with other American industry, is, to greater or lesser degree, dependent on the graduates of the enginering colleges. There is at the present time a shortage of well-trained scientific and engineering personnel. Reasonable estimates indicate that this deficit may easily be as great as 150,000 by 1950. This is a matter of real concern to the railroad industry.

"For years railway work occupied the attention of a fair segment of the engineering profession. Railroad engineers have won wide recognition for their achievements and have held honored places in the profession. Many of our engineering teachers had their early professional experience in the employ of the country's railroads. No doubt times have changed. The railroad lines have been largely built, and yet, if the American railway system is to continue as a modern and efficient mode of transportation, it certainly presents a wide range of challenging problems for engineers, whether their interests lie in management, in research, or in operation.

"The reports of your Committee on Cooperative Relations with Universities bear out the well-known fact that railroad employment is not at the present time attractive to engineering graduates. This is not because the enginering colleges do not now produce men with the proper training for railway engineering work. The railroads can certainly use the present-day product of the engineering colleges, but their prospects of attracting many of them are poor indeed.

"It is the job of an engineering college faculty to direct its students to those fields in which the best opportunities lie; yet on the basis of past performance the opportunities for engineering graduates in the railroad industry do not look particularly bright. If this situation continues, the railroads are going to be in a more and more unfavorable position in competing for the output of the engineering colleges.

What is the Answer?

"The solution to this problem will not be found in encouraging the colleges to give more courses in railway engineering. What the railways need is not men with specialized training, but first-class graduates of various modern engineering curricula. To secure these men, it will be necessary to convince the colleges and their students that railroad salaries, opportunities for advancement and for professional growth are the equal to or better than those offered in other industries. The popular success story of the railroad president being a man who started as a section hand fifty years before may be a glorious tradition, but it has little appeal to the present-day college graduate.

"The engineering colleges can be of real service in supplying well-educated engineers and in assisting in research which is of interest to the industry. In order for the railroads to secure this assistance it will be necessary for them to take advantage of procedures and practices already widely used by other industries. At the present time, railroads do not send representatives to the college campus to interview seniors. They usually have no realistic training program for college graduates, and they make little or no effort to secure students for co-operative training. They seldom encourage their employees to improve themselves through evening classes and extension courses, and rarely, if ever, support scholarships or fellowships. Salary scales for engineers are believed to be low, and advancement unduly slow and without adequate recognition to the training and capabilities of the men. When these conditions are corrected the railroads will again attract a fair proportion of the best engineering graduates."

President Elect Stresses Research

In the following statement prepared expressly upon the request of the *Railway Age,* J. B. Akers, chief engineer of the Southern, and the newly-elected president of the association, directs attention to the enviable position held by the association and its Manual of Recommended Practice, speaks of the responsibilities that rest on members in furthering the work of the many technical committees, and urges continued and expanded research "in the service of the railroads."

"Because of necessary war restrictions, meetings of the American Railway Engineering Association have been cancelled or materially shortened during the last few years. In this our first year of peace, it is well for us to renew our faith in the future and to rededicate our efforts toward improvement of the work of our association, wherever that may be found possible.

"The Proceedings of the association are widely read and our Manual of Recommended Practice has assumed an importance which is truly remarkable. Most of us have had an opportunity to observe the widespread use of the Manual during the war, and know that it has been accepted as authoritative in its field by the army, the navy, the Interstate Commerce Commission, and by all of the interested war-born agencies. The reputation it has attained is an enviable one, and this reputation must be sustained by meticulous attention to all details that bear in any way on the character of its recommendations.

"The most satisfying part of association activities is perhaps to be found in committee work. In this work we find groups of earnest men, all with similar interests and problems—men who form a cross section of the nation, with viewpoints and ideas that completely cover the field. Each member has full opportunity of objecting or adding to, or changing any proposal. That privilege should be exercised to the fullest extent if the results attained are to be representative.

"Committee work should be welcomed

as a privilege. In it we have a responsibility as a group in meeting the problems confronting the railroads. Therefore, everyone is urged to take on as much committee work as possible, to attend meetings, and to dip in his oar in approval or disapproval, as the case may be.

Encourage Research

"As in the past, this annual meeting of the A.R.E.A. is also the concurrent session of the Construction and Maintenance section—Engineering division, Association of American Railroads. All matters pertaining to construction and maintenance are referred to this association by A.A.R., and we have its confidence and support. The support of the A.A.R. is perhaps best shown by its approval of substantial appropriations for expenditure by our various committees for sesearch and development. The amount so authorized by A.A.R. for the current year is $184,553, and embraces such important investigations as those with respect to shelly spots and head checks; rail design; stresses in tie plates; relation between track and equipment; and impact. We owe it to A.A.R. to make sure that the studies for which appropriations are made are carried on with diligence and care, and we intend to produce satisfactory results from the expenditure of these funds authorized on our recommendation.

"A portion of our investigations is carried on under the supervision of our research engineer and his organization. We want to encourage this work in every way. We must initiate the subjects, prove the necessity for research, and then sell the projects to our Board of Direction, whose duty it will then be to secure the necessary appropriations from the A.A.R. singly, or jointly with some other association interested in the same projects.

"It is for us to display interest and enthusiasm ourselves, in the hope that a substantial increase in research and development will be undertaken in the months and years to come. Great work has been accomplished by our association in the past, and I look forward to our undertaking our tasks of the future with renewed vigor and enthusiasm in the service of the railroads."

Reducing Accidents at Grade Crossings

In his discussion of accident prevention programs at grade crossings, Mr. Tenney said in part:

"Over the past 55 years, 386,000 persons lost their lives in connection with the operation of the railroads of our country. Divided up roughly, this figure is composed 3 per cent of passengers, 30 per cent of employees, 4 per cent of trespassers, 20 per cent of grade crossing casualties, and 1 per cent others. Deaths caused by railroad operation reached a high peak in 1917 and have been decreasing steadily since that time.

"Two very persistent problems now plague the railroads with respect to casualties from railroad operation—the grade crossing problem and the trespassing problem. Grade crossing fatalities reached their peak in 1928 with 2,568 deaths, compared with 1,840 in 1944, a reduction from the peak of 28 per cent, but there has been a noticeable upturn in traffic accident deaths since the end of gasoline rationing. The statistics point out the problem, and the Safety section, Association of American Railroads, and the Steam Railroad section, National Safety Council, decided to join in the promotion of a preventive program to endeavor to reduce the number of accidents due to these causes.

"While the death of two thousand trespassers per year does not present as unfavorable a public-relations problem to the railroads as do the grade-crossing accidents, it does affect our public relations to a great extent, and an anti-trespasser campaign is certainly worthy of our best efforts from a life conservation point of view.

"The establishment of a closer relationship between the Association of American Railroads and the National Safety Council in the promotion of this grade crossing and trespasser program should produce substantial results, and it is our intention to keep this alliance well integrated, so that, as our work proceeds, each step will be taken with the approval of both the Council and the A.A.R.

"It is the purpose of the joint grade crossing and trespasser committees of the A.A.R. and N.S.C. to organize this work in all the states, beginning in those states where the grade crossing problem is the most serious. Already some very excellent work has been done in a group of southeastern states, particularly Georgia, and in the states of Mississippi and Minnesota.

"In addressing the Engineering division of the A.A.R. today, I am doing so because the engineering officers of all the railroads in this country can make a contribution to this program. C. J. Geyer, general manager, Chesapeake & Ohio, and Bernard Blum, chief engineer, Northern Pacific, have consented to meet with the Grade Crossing and Trespasser committees of the Safety section of this Association, and the Steam Railroad section, National Safety Council, at council headquarters on Thursday morning to have brought clearly before them by staff officers of the council the details of our program, and especially to have the benefit of their suggestions as to how this program should be carried forward.

"We hope that out of this contact today, and that of Messrs. Geyer and Blum with our committees on Thursday, will come a continuing working arrangement, whereby you can join us in the great amount of promotional work which will be necessary to insure any kind of success in reducing grade crossing and trespasser accidents."

Fatigue Tests

In his address at the closing session on Thursday, Prof. Wilson reviewed briefly experimental data which have been accumulated on the fatigue strength of fabricated steel structural members, and, more particularly, the fatigue tests of welded structural members conducted under his direction at the University of Illinois.

Giving primary attention to those tests made specifically in the interest of the railroads, Prof. Wilson first discussed fatigue tests of eye-bars shortened by various methods; butt welds reinforced with butt straps; double-strap riveted butt joints reinforced with fillet welds along the edges of the butt strap; and reinforced diagonal truss members. He then turned his attention to tests of reinforced diagonal truss members, and to a series of flexural fatigue tests of bridge stringers. Summarizing the results of the tests, he said that, based upon the fatigue strength corresponding to failure at 2,000,000 cycles, results appear to justify the following conclusions:

(1) The three types of specimens planned to represent composite riveted-and-welded joints connecting the two parts of an eye-bar that had been shortened by cutting out a piece and splicing, all had a very much lower fatigue strength than the original eye-bar.

(2) For specimens representing eye-bars that had been shortened by heating and upseting, the fatigue strengths of the shortened and the unshortened specimens were very nearly equal. This applies to both steel and wrought-iron eye-bars.

(3) Adding butt straps attached with fillet welds across but welds connecting plates, greatly reduced the fatigue strength of the joint.

(4) The fatigue strength of the riveted splice of a girder web not designed to resist movement was increased somewhat by connecting the splice plates to the girder web with fillet welds, the magnitude of the increase depending upon the thickness of the web plate and of the splice plates.

(5) Specimens representing diagonal members of a truss reinforced with cover plates extending from and welded to the gusset plates at the two ends, had a much greater total fatigue strength than specimens representing similar members not reinforced.

(6) The unit flexural fatigue strength of rolled 12-in., 31.8-lb. I-beams reinforced with full-length cover plates attached with continuous $\frac{3}{16}$-in. fillet welds, was considerably less than the unit flexural fatigue strength of the same beams in the as-rolled condition. The reduction in the unit fatigue strength due to the welds offset almost completely the increase in the section modulus due to the addition of the cover plates, and the total fatigue strength was only slightly greater for the reinforced beams than it was for the beams that were not reinforced.

For rolled 12-in., 31.8-lb. I-beams reinforced with full-length cover plates attached with $\frac{3}{16}$-in. intermitent fillet welds, the total fatigue strength was less for the reinforced beam than for the beam without reinforcement.

(7) Attaching partial-length cover plates to 12-in., 31.8-lb. I-beams greatly reduced the total fatigue strength of the beams and should not be permitted. Various expedients for reducing the stress-raising factor at the ends of the partial-length cover plates were ineffective.

(8) Attaching small plates to the bottom flange of rolled 12-in., 31.8-lb. I-beams, plates such as are used as gusset plates for stringer laterals, greatly reduced the fatigue strength of the beams. This was

true for plates attached with transverse fillet welds, longitudinal fillet welds and ¾-in. rivets.

Affairs of the Signal Section

The contribution of signaling, particularly C.T.C., to the expediting of traffic during the war peak should focus attention on the advantages of this system, said Chairman Reich of the Signal section in his address before the opening session. Originally, said Mr. Reich, C.T.C. was regarded as a system which might be installed on a given territory simply because of the economic return, in that fewer attended offices were required, and where the expenditure could be justified. However, experience has indicated that the possibilities of the system are more far-reaching if careful consideration is given to the physical arrangement of the road. Mr. Reich then gave details of 10 factors that require consideration in proposing installations of C. T.C.

These considerations place emphasis on speed or, in the final analysis, reduced train hours, and it follows that stability of the switch structure to withstand the heavier stresses is essential to dependable performance of the control system; likewise the signaling of sidings with associated track circuits will require the maintenance of track with ballast resistance well within the limits prescribed for reliable operation of track circuits; a requirement that is economically of major importance as, with low ballast resistance, a larger number of track circuits will be required for a given territory, increasing installation and operation costs.

An interesting development in signaling, pointed out by Mr. Reich, is the remote control of absolute manual block systems with continuous track circuits, as developed by the Wabash. While not a substitute for C.T.C., he said this system employs certain of the features of C.T.C. and would appear to be advantageous for light traffic lines. Still another development is a simplified type of automatic block signaling installed in single-track territory on the Chicago, Rock Island & Pacific, based on continuous track circuits with signal protection extending from siding to siding, there being no intermediate signals such as would be required to permit trains to follow one another in a station-to-station block. Coded track circuits were used, eliminating the need for line wires and pole line construction.

In the electronics field, signaling has kept pace, said Mr. Reich, as evidenced by the development of carrier for C.T.C., in which case the application of one or more carrier circuits on a pair of controls permits the breaking up of long sections of control, avoiding the need for additional line wires which otherwise would be necessary.

While the technical engineering of communication requirements is not the function of the Signal section, Mr. Reich felt that some mention should be made of the growth of inductive carrier and of space radio train communication. Experimental installations of both types of communication in various types of railroad service have been made, and it is noteworthy, he said, that some rather extensive installations of a permanent nature are either now under way or authorized on a number of roads.

Activities of Electrical Section

In his review of the activities of the Electrical section, Mr. Trissal spoke in part as follows:

"Several years ago the A.A.R. was active in the vision of the National Electrical Safety Code. After the 5th Edition of the National Electrical Safety Code was approved, the Electrical section entered into negotiations with the private utilities companies, as represented by the Edison Electric Institute, in an attempt to formulate some principles and practices, as well as accompanying specifications, to be followed by these companies when their lines cross railroad property. The principles and practices formulated have been approved by the membership of the Electrical section and by the general committees of the other divisions involved, and have now been submitted to the Association of American Railroads for formal approval.

"A number of years ago the electrified railroads began noticing that anchor rods were corroding rapidly, presumably as a result of electrolysis. Other railroads where anchor rods were protected with a covering of concrete did not experience such difficulties, and because of these differences in experience, request was made for a research allotment to determine the effect of electric current on concrete and, if possible, the amount of concrete necessary to insulate an anchor rod. The results which were obtained from the research carried out were described in A.R.E.A. Bulletin 457, beginning on page 316,* and indicated to all of us that concrete foundations and anchor rods on electrified lines must be inspected at regular intervals to determine what damage, if any, is being caused by electrolytic action.

"We have been giving considerable attention to safety precautions to be followed in electric welding. It is known that when welding is done in shops with a-c welders, transient voltages of very high magnitude are sometimes encountered, with the result that precautions must be taken against these voltages. This presents a very perplexing problem, for if a workman is saddled with too many precautions and rules, the quality and quantity of his work are greatly affected. Certain recommendations as to safety measures have been made and others will follow from time to time.

"The Electrical section has made a preliminary report on the use of electric strip heaters in the chutes and pockets of coaling stations to keep them from freezing. It is now, in conjunction with the Signal section, preparing manufacturing specifications covering electric snow melters, and in studying the electronic control of motors.

"One of the new problems confronting the electrical departments of railroads is that of providing a reliable source of power for various communication circuits, such as carrier telephone and telegraph, as well as radio. While the power supply on locomotives and cabooses will be primarily the responsibility of the Mechanical division, we must be assued of an adequate and reliable source of supply at all fixed points."

Cooperation With Universities

F. R. Layng, Chairman*

This committee submitted progress reports, presented as information, on five of its six assignments. These reports were preceded by a foreword explaining the purpose of the committee's work and the need for attracting properly trained young men to careers in railway service.

Appreciation of University Training—One of the assignments of this committee is to stimulate greater appreciation among railway and university officers of (a) the importance of instruction in transportation and economics for men entering railway service, and (b) the necessity for presenting instruction based on current railway conditions and taught by men of ability and experience. This report reproduces a portion of a letter from Rensselaer Polytechnic Institute, which explains that too much specialized training is undesirable and that students should spend more time on basic courses. The letter also suggests that there is room for improvement by the railways in methods of employment and training men for key positions. A portion of another letter is presented, which mentions the apathy of railroads towards technically-trained new employees.

Acquainting Universities and Colleges with A. R. E. A.—In carrying out its assignment to call to the attention of universities such information developed by the association as is thought to be of special interest to them, the report quotes portions of a number of letters received from various colleges in response to a copy of the complete report of this committee last year, which was sent to these institutions. Several of these letters mention the lack of interest in graduates on the part of the railways, and others state that opportunities and salaries must equal those in other fields of engineering endeavor if the railways are to succeed in inducing college men to plan railroad careers.

Co-operative Education—On its assignment to stimulate a greater interest in the science of transportation among university students, the committee reported that it has made a study of the extent to which the railroads have made use of the co-operative system of education, and then presented excerpts from some of the replies on this subject. Replies from roads that favor the plan and are now using it indicate

** An abstract of the report on this subject is presented elsewhere in this issue.*

** Chief Engineer, Bessemer & Lake Erie.*

that the war has seriously disrupted their programs, but that they will be continued in departments where agreements with labor do not prevent. Replies from railroads that favor the plan but have not used it, indicate a definite interest and a desire to work out an arrangement to make use of co-operative education.

Two replies that oppose the plan mention the disadvantages of alternating school and employment for short periods of time; one suggests that returning servicemen who are engineering graduates will be given preference for some time to come; and two other replies express the viewpoint that a system of special apprenticeship training on the railroad for likely college graduates is better than the co-operative system.

Investigate Textbooks—On its assignment to investigate textbooks and other material available for instruction in railway engineering, the committee stated that a bibliography has been prepared, and then offered the following tentative conclusions: (1) There is no satisfactory college textbook on railway engineering; (2) there is some excellent supplementary material; (3) the tendency in engineering curricula is toward the elimination of special instruction; (4) there is a desire on the part of some engineering teachers interested in the railways for modern text material; and (5) the committee should attempt to outline the content of a modern text on railway engineering and submit it to reputable publishers, with recommendations as to men competent to write it.

Conclusions and Recommendations—In carrying out its assignment to develop conclusions and recommendations, based upon a review of its previous reports, the committee presented the following conclusions:

Concerning the stimulation of greater appreciation among railway and university officers of the fundamental importance of college training for young men entering railway service and the necessity of courses based on current railway conditions taught by men of ability and experience—(a) Some railways have evidenced appreciation of instruction in transportation and economics. (b) University officers are not inclined to provide courses in railway transportation unless the railways show greater interest in college-trained men. (c) Railways should take advantage of the willingness of university officers to supply men with basic training in transportation and economics. (d) Other branches of the transportation industry are more active in the employment of men with college training. (e) Co-operative instruction can be made effective under a joint arrangement between a university and a railroad, wherein the railroad offers summer employment —this employment to constitute carefully developed and properly supervised courses of practical experience and instruction, with payment therefor sufficient to be of material assistance in meeting living and school expenses. The railroad should offer employment to students each summer during their university programs, provided they show a real interest in their work and demonstrate their capacity to make progress.

With respect to bringing to the attention of universities and colleges such information and conclusions developed by the association as will be of special interest or value to them, the committee said: (a) Railway engineering and transportation offer worthwhile opportunities to college and university-trained men. (b) There is an apparent lack of suitable railway transportation textbooks and a very definite need for texts of an up-to-date nature embodying recent economic developments in construction, operation and maintenance. (c) Contrary to the views held by a few, there is every reason for placing confidence in the future of the railways, and an equal degree of confidence may be placed in his future by the young man who associates himself with the railway industry. (d) The work of the A. R. E. A. as developed in the Manual has been made available to engineering colleges and universities, and the majority use the Manual regularly. (e) It is regretted that a few outstanding colleges and universities have discontinued or curtailed their courses in railway transportation.

With respect to its assignment on developing means of bringing to the attention of railway managements the value of a technical education for young men entering railway service, the committee concluded: (a) Employment of college-trained men is advantageous for creating a reserve for supervisory positions and to keep abreast of other industries. (b) Desirable college men, in addition to educational qualifications, have high character and leadership ability. (c) The railways are behind other industry in seeking such men. (d) Industries to a greater extent than some railways, have definite policies and organized methods for securing college men. (e) A few railways with training systems have been able to attract desirable men and records have shown the value of these practices.

On its assignment on the stimulation of greater interest in the science of transportation among college students, the committee's conclusions were: (a) Technically-trained young men are not now being attracted to railway service. (b) Universities are not giving courses that will best prepare the students for railway service. (c) The discontinuance of courses in railway transportation has been the result of apparent, if not real, lack of railway interest.

On developing means whereby university facilities may be made available for research for the railway industry, the committee's conclusions were as follows: (a) The value of research is being increasingly recognized by the railways. (b) Research may be carried out in university, railway and industrial laboratories. (c) Many engineering colleges have well-equipped laboratories and are almost invariably willing to co-operate. (d) College facilities are so located as to avoid the concentration of research activities ,and may permit research dealing with materials or processes applicable to a particular section.

Discussion—C. C. Williams, consultant in engineering and industrial education, Madison, Wis., lamented the fact that more college representatives cannot or do not take an active part in the deliberations of the committee, to get more of the college viewpoint into the committee's deliberations, and then volunteered the suggestion that, except for highly specialized positions, for which university graduates might be desirable, the railroads might find a large reservoir of adequately trained men in the junior colleges and technical schools.

C. H. Blackman (L. & N.) took exception to the implication in Mr. Williams' comments, that the railroads could get along with mechanics for engineers, and insisted that there is a real opportunity on the railways for the best college-trained men, citing several examples to prove this point.

Chairman Layng, in defense of university representatives, named the college representatives on the committee and commended them for their activities, pointing out that he was more concerned about equally effective co-operation from railroad men.

C. H. Mottier (I. C.), speaking at some length about conditions in employment since 1930, emphasized the importance of attracting and holding college graduates in the engineering department, and pointed out that the major problem in attracting college-trained men to the railways today is one of "dollars." He asserted that the railways cannot expect to hire competent engineers for anything like what they have been paying, and suggested that it may be necessary for them to pay graduate engineers from $250 to $275 a month in order to attract and hold them—along with promises that these men will receive increases at specific intervals during at least the first three years of employment.

At the same time, he cautioned against the hiring of too many university-trained men, to avoid creating congestion at the top with resulting dissatisfaction, and closed with the statement that the solution of the problem of attracting college-trained men to the railroads lies primarily with the railroads themselves, and not with the universities of the country.

Summarizing for the committee, Chairman Layng endorsed the comments of Mr. Mottier and agreed that the major responsibility of the committee, having established the facts, is now to bring this matter forcefully to the attention of railway managements.

Location—Operation

M. F. Mannion, Chairman*

This committee presented progress reports on three of its nine assignments.

Revision of Manual—In a progress report on Revision of Manual, the committee referred to the authorized consolidation of Chapter 21 with Chapter 16, which becomes Chapter 16, on Economics of Location and Operation, and recommended several editorial revisions in the reprinting of the new chapter, which were submitted for formal ratification.

All of these recommended revisions were approved.

** Office Assistant to Chief Engineer, Bessemer & Lake Erie.*

Sidings for Freight Trains—On its assignment to study methods or formulas for more economical and efficient railway operation, the committee submitted as information a progress report on length of sidings for freight train operation, with the recommendation that this subject be continued for further study. This report states that longer sidings with power-operated switches and longer turnouts have resulted in greater operating efficiency because trains can enter and leave sidings at greater speed, thus reducing the time lost for train meets and otherwise expediting traffic generally. It discusses the general factors which determine the desirable length of sidings, including number of cars per train, average lengths of cars, locomotives and cabooses, stopping distance in sidings, slack in cars, track clearance, signal clearance and highway crossing protection, and offers a simple formula for length, based on these factors.

Railway Electrification—On its assignment to study the economics of railway location and operation, as affected by railway electrification, the committee submitted as information a report devoted to the Diesel-electric locomotive. At the outset, the report discusses the availability of Diesel-electric motive power and cites a number of examples in this regard, pointing out, however, that the mileages being obtained under steam locomotive operation are also increasing regularly. Next, the report compares at some length the maintenance and reliability of steam and Diesel-electric power for high-speed operation, heavy freight and passenger service, and switching and yard service. Tables are submitted showing comparative unit repair costs on a number of railways, and also the effect of age on Diesel repair costs.

In summary, the report states that high utilization must be obtained to justify the higher first cost of Diesel power, as compared with steam power; that in regard to operating costs, the electric locomotive is at a disadvantage with respect to fuel costs, the Diesel in lubrication costs, and the steam locomotive in fuel, water, enginehouse expenses and repair costs (except lubrication). The steam locomotive has a decided superiority in fixed charges, including first cost, depreciation, interest, taxes and insurance. The electric locomotive shows advantage in depreciation costs, while the Diesel-electric locomotive enjoys no advantage at all, except in yard service when Diesel switchers can displace steam power on a five to seven basis.

With regard to the six operating characteristics of overload capacity, high acceleration, availability, flexibility, use factor, and freedom from complete breakdown, the steam locomotive is at a disadvantage in all six, the Diesel has advantages in all but the first factor, and the electric locomotive has advantages in all but the last two mentioned. In consideration of special features, such as smoke elimination, damage to roadbed, merchandising appeal and dynamic braking, steam power is again at a disadvantage as compared with Diesel-electric and electric power. Finally, with respect to the possibility of eliminating facilities necessary to operation and maintenance, steam power is again at a disadvantage, but an offset to this lies in the fact that the maintenance of any substantial number of electric or Diesel-electric locomotives requires special shops, entailing substantial capital expenditures.

Water Service

*B. W. DeGeer, Chairman**

Reports on 6 of its 10 assignments were presented by this committee, including revision of the Manual, two progress reports presented as information, and three final reports, two of which were also presented as information.

Revision of Manual—Under this subject, the committee recommended a change in specifications concerning indicators for welded steel tanks for railway service and submitted a revised and abridged list of terms in the Manual Glossary for substitution for the terms relating to water service now appearing therein. The committee also submitted specifications and plans for timber substructures for wood water tanks of 50,000-gal. (16 ft. by 24 ft.) capacity, and 100,000-gal. (20 ft. by 30 ft.) capacity, with the recommendation that they be approved for publication to replace corresponding specifications and plans now in the Manual.

All of these recommended revisions were approved.

Pitting and Corrosion in Locomotive Boilers—The committee offered as information a progress report on its assignment to investigate the cause and remedy for pitting and corrosion of locomotive boiler tubes and sheets, with special reference to the status of the embrittlement investigations. This report states that a study of the use of organic inhibitors and sodium nitrate to prevent intercrystalline corrosion confirms previous reports on preventatives for this particular type of corrosion. The report also states that several locomotives with welded boilers may be placed in service in 1946 and that their performance will be followed carefully in order that the committee may be able to report fully at a later date on this method of construction as a preventative of intercrystalline corrosion.

Governmental Regulations Pertaining to Railway Sanitation—In a progress report on its assignment to keep the association informed of progress being made by federal or state authorities on regulations pertaining to railway sanitation, the committee explained that a revision of the Public Health Service Drinking Water Standards has been proposed to clarify the 1942 standards and to establish a standard that will be applicable to all public water supplies in the United States, and pointed out that this revision does not materially change the standards as affecting the railroads. The committee also reports that the Joint Committee on Railway Sanitation, A. A. R., held conferences in July and August, 1945, with the United States Public Health Service on proposed changes in the Sanitation Manual for Land and Air Conveyances, and on the Interstate Quarantine Regulations, which, it is understood, will apply only to new installations, except where contamination is found in existing installations.

The committee called special attention to the revision of the section on hydrants, Section II, Item 1, in the Sanitation Manual, which it presented in full in its report. This section, the committee pointed out, places severe restrictions on the installation of new watering hydrants used for the delivery of drinking water, which will involve considerable expense at many locations because duplicate sewer lines and sump pumps would be required. An attempt is being made to develop a hydrant which will have suitable drainage and frost-proof characteristics and still avoid the necessity for installing duplicate sewer lines.

The report also states that another proposed revision of the Sanitation Manual calls for toilet facilities in each diner, to which the railroad representatives objected. At one of the meetings of the Joint Committee with the United States Public Health Service it was proposed to study the discharge of all fecal wastes from conveyances into a tank or tanks under the car, which would be emptied from time to time in a sanitary manner, and the Board of Directors of the A. A. R. has authorized a program of research for a thorough study of this problem.

Taking Water Samples—Under its assignment to study methods for taking water samples, the committee submitted a final report, presented as information, giving general instructions for the collection of boiler water samples.

Removing Oily Deposits in Locomotive Boilers—In a final report on its assignment to investigate methods of removing oily deposits from the inside of locomotive boilers, which was presented as information, the committee explains that considerable damage to fire boxes and staybolts has been ascribed to accumulations of oil inside locomotive boilers with open-type feedwater heaters under certain circumstances. The report goes on to describe cleaning experiments with soda ash; caustic soda; sodium metsilicate with a sulfonated-alcohol-type wetting agent; and a combination treatment with trisodium phosphate, sodium metasilicate, sodium-hydroxide and a wetting agent. As a result of these experiments, the committee said:

"The conclusions arrived at from these experiments indicated that all of the procedures used had a certain degree of merit, inasmuch as all resulted in a reduction of leakage at staybolts. The greatest improvement in the elimination of leaks and in obtaining a clean boiler was effected by using sodium metasilicate and a wetting agent in the proportions of 0.5 oz. and 0.05 oz., respectively, to a gallon of water, and boiling under 100-lb. pressure with fire in the firebox. This procedure has been made standard practice on the road which made the various experiments described, and the results obtained are said to be satisfactory. The only variable now involved is the frequency of the boiling operations. Instructions call for boiling of open-heater equipped boilers at least once a year, or as often as necessary, which in extremely severe cases may be every 30 days. The boilers have been rendered clean inside and

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* *Engineer Water Service, Great Northern.*

water tight, and are being kept in this condition by this method."

Conserving Labor and Materials—The committee submitted as information a brief final report on this assignment, which reviews some of the conservation practices developed during World War II. The report states that some of the practices developed during war-time for conserving material will be continued because of their economic advantage, and also states that the committee now has a representative on the General Reclamation section of Committee 3A, Purchases and Stores Division, A. A. R., to study and report on methods for salvaging additional items of water service material. It adds that this class of material can generally be salvaged best by water service departments.

The report also mentions the scarcity of labor and cites some examples of the use of labor-saving equipment in water service work which were helpful in conserving labor. In two conclusions, the committee said:

"The railways have displayed resourcefulness and ingenuity in combining to the best advantage the use of salvaged and substitute materials with the limited allotment of new material available. This combination carried them through the critical war period under a greatly increased traffic load.

"The demand for all kinds of new materials will be very urgent in the immediate future, and the railways should make plans to see that they receive a fair proportion for their requirements."

Report on Highways

*A. P. Button, Chairman**

The committee presented reports on three of its six assignments. Under Revision of Manual it recommended the deletion of a paragraph on changing the alinement of highway crossings that do not cross the tracks at right angles; the elimination of instructions on the location of 50-deg. reflector-type signs at railroad-highway grade crossings, since the signs should be located to admit the best view by persons approaching the crossings; and the adoption of a specification relating to the tops of footings for various types of highway crossing signs, warning signals and automatic gates. These recommendations were adopted.

Design of Highway Crossings—One of the assignments of this committee is to investigate the design and specifications for highway crossings at grade over railway tracks. In a progress report on this assignment, the committee presented specifications for the construction of prefabricated, sectional, treated timber crossings, with the recommendation that they be adopted for publication. This recommendation was approved.

Grade Crossing Protection—Under its assignment to investigate the comparative methods of various types of grade crossing protection, collaborating with the Committee on Signals and Interlocking of the Signal section, A. A. R., and with the Highway Research Board, the committee submitted a progress report as information on tests of Scotchlite reflectors, and Alzak, Cuneo and Mirolite signs.

In its conclusions, the committee said that tests of some of the reflecting materials have progressed to such an extent that it can recommend the use of these materials where flashlights, gates or street lights are not in service and the expense of reflector button signs is not justified.

* *Designing Engineer, New York Central, Lines West of Buffalo, and Michigan Central.*

Buildings

*H. C. Lorenz, Chairman**

Reports were presented by this committee on two of its six assignments, both of which were final reports, presented as information.

Color Dynamics—The report on color dynamics as an aid to efficiency explains that the proper blending of colors, which has been termed "color science," will increase production, reduce personal injuries, provide better working conditions, and also improve morale. It goes on to discuss in a general way the psychological effect of colors and combinations of colors and the light-reflecting values of various individual colors. Included in the report are floor plans of a chemical laboratory and physical laboratory of the Chesapeake & Ohio at Huntington, W. Va., which were painted in accordance with the principles of color dynamics.† The plans show the various colors used for the rooms and equipment. Also included in the report is Exhibit "A," a four-page section of color harmony suggestions.

As its conclusions, the committee presented the following:

"Color painting has innumerable benefits and plays an important role in increasing production, reducing injuries, giving better working conditions, and uplifting the morale of the workers.

"It must be borne in mind that many different color arrangements are recommended for various types of work, and for this reason no rule can be set up which will apply to every problem.

"To secure the best color scheme, an expert should be consulted as to proper blending or matching; however, the selection will usually be made by the person or persons in charge of the work, who will exercise their individual preferences or tastes.

"Proper light reflection values of various colors should be considered when making a selection so that proper light accompanies the color arrangement.

"Streamlining is preferred in color painting. However, color painting can be used on old facilities with proper study.

"Industrial plants have used this mode of painting for a considerable period of time because of its many advantages; therefore, railroads to parallel the success of other industries must realize that dark, drab and somber painting is obsolete, and must step forward into the color painting field."

Prefabricated Buildings—In a final report on prefabricated buildings for railway use, the committee discusses briefly the erection of prefabricated structures and the types of units made for this type of construction, including all-metal buildings and panel units with wood frames. The report adds that many railroads have used prefabricated buildings in recent years for labor-camp, bunk-house and mess-hall installations, and for small garages, flag cabins, section houses, tool sheds, etc. The committee does not recommend prefabricated structures of more than one story in height because, with changes in use, excessive loading on the second floor might cause collapse. In many cases, because of building-code restrictions, prefabricated structures cannot be erected in cities or towns.

The committee concludes that each building problem should be studied individually before adopting prefabricated construction, and points out that occupancies introducing heavy loadings and rough operations may develop extraordinary maintenance and repair, which will soon entail expenditures, coupled with the initial cost, far exceeding the cost of a more permanent form of structure.

The report was received without discussion.

* *Assistant Engineer, Cleveland, Cincinnati, Chicago & St. Louis.*

† *An article explaining the principles of color dynamics and its application in these laboratories was published in the* Railway Age *of January 12, page 138.*

Work Equipment

*C. H. R. Howe, Chairman**

The Committee on Maintenance of Way Work Equipment presented reports on 7 of its 11 assignments, 5 of which were final reports, presented as information, while 2 were progress reports.

Revision of Manual—Under this assignment, the committee submitted a progress report which recommends making permanent the war-time emergency provisions concerning flexible gasoline lines.

This recommendation was approved.

Tie-Cutting Machines—On its assignment to investigate tie-cutting machines, the committee submitted a final report, which states there is but one type of tie-cutting machine available at the present time. It describes briefly the construction and operation of this machine which, it points out, cuts the ties into three pieces so they can be removed with a minimum of disturbance to the tie bed underneath.

Repairing Work Equipment—On the subject of organization, machinery and tools for repairing maintenance of way work equipment, the committee submitted as information a final report which discusses briefly the importance of providing for proper maintenance and repair of work equipment and states that it is desirable

* *Cost Engineer, Chesapeake & Ohio.*

to have one system or regional shop. The larger shops, it says, have the advantage of better facilities and the employment of skilled mechanics which are not available or justified for smaller shops. In addition, it points out, such shops permit the salvaging of usable repair parts on a large scale and centralization of the stock of repair parts, thus reducing inventory.

The report then discusses the organization and duties of forces for the maintenance and repair of work equipment, including the superintendent of work equipment, shop supervisors, inspectors, road supervisors, maintainers, mechanics, and work equipment operators. It also lists the tools and equipment recommended for a work equipment shop, including its electric shop tools and equipment, gasoline engine testing and reconditioning equipment, woodworking tools and machinery, and miscellaneous tools and equipment.

Hoisting Equipment—A final report, offered as information, was submitted by the committee on its investigation of hoisting equipment. This report points out that equipment for handling materials ranges from human arms and backs to cranes that will lift locomotives. It then explains briefly the principle of the lever, including the hand winch or windlass, block and tackle and chain hoist. This is followed by brief descriptions of the various supporting devices used with block and tackle, chain hoists, portable electric hoists and power winches, which include the tripod, gin pole, A-frame, breast derrick, jib crane, pillar crane, hand-type derrick car, sand hoist, steam or air rail loaders, pile drivers, and on-track cranes. The report also describes the Diesel-powered tractor with a power take-off winch and hoisting equipment which, it states, was specially designed for laying pipes in trenches, but is readily adaptable as an off-track machine for laying rail and handling other maintenance materials.

Diesel Engines—A progress report, offered as information, was presented by the committee on its assignment relating to Diesel engines. This report reviews briefly the early history of the internal combustion engine and the Diesel engine, and then discusses briefly the principle of the gasoline, semi-Diesel and Diesel engines, and the relative cost and weight of these units. Concerning the relative cost of the two types of power for small units (5 to 10 hp.), it is estimated that the cost of the Diesel may be from 2½ to 4 times that of a gasoline engine of the same horsepower, but it is pointed out that with larger units the cost may be more nearly equal. The report also discusses the relative merits of four-cycle and two-cycle Diesel engines and fuel injection systems and starting facilities for Diesels.

Electromagnets—A final report on the use of electromagnets in maintenance of way work describes briefly the principle of the electromagnet, discusses the types commonly used, explains the construction and presents a table of electromagnet characteristics. The report mentions that circular magnets are more generally used because they are adaptable to a greater variety of applications. It also states that the power plant should be an independent engine or motor, if possible, because if the generator is operated from a power take-off, the crane engine is slowed momentarily when making a lift, just at the time when it is desired to get as large a load on the magnet as possible. Also recommended are reversing switches which give a quick discharge of the load, and the practice of keeping the current off a magnet during the return swing.

The report states that, in some cases, the use of magnets has resulted in a safer way of handling materials, and that angle bars, tie plates, rail anchors and switch materials, as well as kegs of bolts and spikes, are examples of materials which can be handled satisfactorily by electromagnets. It explains that the use of an electromagnet often requires only the employment of the operator of the machine, whereas the use of hooks, clamps or other devices for picking up a load requires another man to attach the hook, clamp or other device.

Relating to this assignment, the committee offered the following conclusions:

"Electromagnets may be used to handle materials in much maintenance of way work. The attainment of economy in doing work along the right of way imposes the same problems that are encountered in a material or scrap yard. The operation may involve work train equipment or it may call for crawler or truck-mounted machines which move to the work. The use of magnets will, no doubt, be expanded in the future."

Oil Filters—A final report on oil filters, presented as information, discusses the various types of filters and the manner in which they remove impurities from oil. The report suggests that a large filter is good for longer service than a small one and will reduce renewal costs. Lubricating oil filters remove moisture, unburned fuel, road dirt, carbon, metal particles and sludge; therefore, their use results in more economical engine operation because less frequent oil changes are required, oil consumption is reduced and motor parts wear longer. In general, it is pointed out, the use of oil filters reduces replacements and repairs of pistons, piston rings, piston pins, piston pin bearings, connecting rod bearings, crankshafts, valves, valve guides, valve seats and gaskets.

Turning to the subject of fuel oil filters for internal combustion engines, the committee explains the type used on gasoline engines and the principle of fuel injection on Diesel engines. Concerning the latter, its report states that an extremely efficient fuel oil filter is absolutely necessary on Diesel engines, so that no foreign matter in the fuel will cause engine failure due to clogging of the fuel injection nozzles, the openings in which are very small. In selecting filters, it says, it is a safe rule to allow 150 to 200 cu. in. of filtering capacity for each 100 hp. of Diesel engine capacity, or for each 125 hp. of gasoline engine capacity. It is recommended that large tandem or double-type filters, or two single units connected in parallel, be used on large engines, so the engine can be operated continuously while one battery of filters is being cleaned.

Closing its report, the committee offered the following conclusions:

"Lubricating oil filters are necessary to keep the oil free from foreign substances. They will prolong the service life of engines between shopping periods.

"If it should be desired to change from one filter to another, the capacity required should be discussed with a filter expert.

"The change of a filter of the sealed type, the replacement of a removable cartridge, and the removal and cleaning of a washable-type filter should be based either on the hours of service or the mileage made, although the need for servicing at other times may be indicated by the appearance of the oil.

"No fixed maintenance procedure can be set up for the cleaning and reconditioning all filters. The manufacturer's instructions should be followed for the particular filter in use.

"If oil is dirty or cloudy, check the inlet and outlet pipes, and if both are open, give the filter the attention recommended by the manufacturer."

Yards and Terminals

***W. J. Hedley**, Chairman**

This committee submitted reports on 2 of its 10 assignments, one of which was a progress report, presented as information, on its assignment to compile a bibliography on subjects pertaining to yards and terminals appearing in current periodicals.

Produce Terminals—The committee submitted a final report on this subject for substitution in the Manual in place of the material now contained in Section 36, pages 14-28 to 14-31, inclusive. The new material rearranges and expands the data and recommendations on produce terminals to differentiate between railway perishable freight yards and wholesale produce markets. It contains reference to produce terminals in general, and to the functions of railway and marketing facilities, and recommendations on the design of track layouts, buildings, driveways and platforms for such terminals. Also included are suggestions concerning icing facilities, garbage and refuse disposal, drainage, floodlighting, fencing, etc.

This material was adopted without comment.

Roadway and Ballast

***W. C. Swartout**, Chairman†*

This committee presented reports on 6 of its 14 assignments, two of which were final reports, submitted for adoption, and the others progress reports, presented as information.

Culverts—On its assignment to develop specifications for asphalt coating and paving of corrugated iron culvert pipe, the committee submitted for adoption and publication in the Manual the specifications as

* *Construction Engineer, Wabash.*
† *Assistant Engineer, Missouri Pacific.*

submitted in 1945, except for several modifications in the adhesion test.

This specification was adopted.

Roadway Drainage—On its assignment to check the extent to which recommended practices of the association relative to roadway drainage are being followed by the railroads, the committee submitted a progress report, presented as information, which states that engineering officers are aware of the increased importance of roadway drainage. Generally speaking, rock drains for drainage of water pockets have not proved satisfactory, and other methods, such as pole-driving and grouting are being used. Recommended practices for surface drainage, it said, are generally being followed.

Roadway Protection—On this assignment, the committee submitted a progress report, presented as information, which discusses the stabilization of roadbed by pressure grouting. The report mentions briefly the two types of grouting equipment, pneumatic and hydraulic, and explains the two schools of thought concerning the use of rich and lean grout mixtures. It also mentions several features of grouting technique, explains that the cost of grouting varies considerably and cites several examples of savings. The committee concludes that pressure grouting has important possibilities as a remedy for soft track and that the saving in maintenance cost more than warrants the first cost of doing the work, regardless of permanence. A bibliography of articles on pressure grouting is also presented.

First Progress Report on Roadbed Stabilization—Appended to the report on the foregoing subject, the committee presented its First Progress Report of the Investigation of Methods of Roadbed Stabilization. This investigation was begun in May, 1945, at the request of the A. R. E. A. Committee on Roadway and Ballast, and is a co-operative investigation by the Engineering division, A. A. R., and the Engineering Experiment Station of the University of Illinois. Studies have been made during the year on five railroads to learn (1) the conditions under which unstable roadbeds develop due to ballast pockets, (2) the details of the grouting procedures now in use, and (3) the manner in which the grout is distributed within the roadbed after injection. In addition, maintenance records will be accumulated for the locations studied and will be used in the future to judge the success of grouting.

The report begins with a general explanation of the essential features of grouting procedure, including the types of equipment used, and then describes in detail the conditions, grouting procedure and results of the tests on each of the five roads.

On the Chicago, Rock Island & Pacific, tests were made on a 15-mile section of single-track main line between Mercer, Mo., and Princeton, which was constructed in 1942. The report describes the general soil, sub-ballast and ballast conditions on this test section and presents a table showing the characteristic physical properties of the clay in the subgrade, which indicate that it is highly plastic. The report goes on to describe the grouting, which was done with a Koehring mud jack, with grout mixes varying from 1 to 6 to 1 to 12. Included is a graph showing the mechanical analysis of the grouting sands and a number of typical ballast cross-sections, before and after grouting, which were obtained by digging trenches laterally across the track.

The tests on the Missouri-Kansas-Texas are located on a section of track 10 miles long near Savonburg, Tex. The report describes the soil and track conditions; the equipment used, which included a specially-designed hydraulic grout pumping unit; and the grouting procedure. Also shown are a cross-section after grouting, photographs of the equipment, and a graph of the mechanical analysis of the grouting sand. The grout mixture used consisted of 1 sack of cement to 8 cu. ft. of medium fine sand and 30 gal. of water, with an admixture of ½ gal. of asphalt emulsion.

On the Atchison, Topeka & Santa Fe, tests are being conducted on a continuous out-of-face grouting job 12 miles long in the vicinity of Olathe, Kan. The report presents data on the soil constants of the subgrade, which show it to be an inorganic clay of medium to high plasticity. It also describes the track conditions and previous attempts to stabilize the track with subdrainage. Hydraulic methods of grouting were used and, in general, a lean mixture (1 to 12) with 40 to 45 gal. of water and 1.2 gal. of emulsified asphalt was used, although at some very soft spots, or slide areas, a 1 to 6 mix was used. The report describes the grouting methods and organization and presents a number of photographs and cross-sections before and after grouting. Also shown is a table of deflections of the track under traffic loads on 10 successive tie plates before and after grouting.

The tests on the New York Central were made at two points, one on a 5-mile section of the Michigan Central, near Welland, Ont., and the other on the New York Central proper, near Vermilion, Ohio. The report on these tests is confined primarily to a discussion of the former, and includes track and soil conditions, grouting methods, etc. This work was done with a company-built pneumatic grouting machine, which is described, and in this work, it was pointed out, the ballast material was first washed with about 8 gal. of water, followed by one batch of a very rich grout mixture, after which successive batches consisted of 1 sack of cement, 1 cu. ft. of sand and 8 gal. of water.

Tests were also conducted on the Chicago, Milwaukee, St. Paul & Pacific, on a section of single-track line about 3¾ miles long, traversing the Missouri river bottom near Owego, Iowa. The subgrade material in this instance is a highly-plastic black gumbo clay. The report shows cross-sections of a number of typical ballast pockets and describes the grouting procedure and equipment, which included a penumatic grouting machine. Various modifications of grouting procedure were used at various locations on this project.

Concerning these tests, the report concludes, it is of interest to note that the subgrade material at every location studied in the investigation consists of clay of medium to high plasticity. No sands, silts or even silty clays have been encountered below ballast pockets. It has been the intention to avoid all speculation concerning the manner in which the grout accomplishes its desirable effects, feeling that, in time, the facts will lead to an understanding of the nature and value of the grouting process.

The address by Professor Peck of the University of Illinois followed immediately after the report on roadbed stabilization. Supplementing his remarks with a color moving picture showing grouting practices on the Santa Fe, and with slide films consisting mostly of roadbed cross sections after grouting, Professor Peck gave considerable additional information regarding the investigation of roadbed stabilization.

Structural Support—In the second part of this assignment, to study roadway protection by means of structural support, such as struts and piling, the committee submitted a progress report, presented as information, to solicit comments and criticisms, with the hope that it may be submitted next year for inclusion in the manual. The report consists principally of drawings, including a typical timber pile retaining structure, with a table showing the spacing of piles with and without sloping surcharge; three different methods of tieing timber piling together for protection of sliding fills; a method of using scrap rail piling and tie rails for this purpose; and a combination rail piling and timber retaining wall. The report also mentions the use of concrete piles with reinforced concrete planks for retaining walls and shows a drawing of a wall using grooved reinforced concrete sheet piling, with a buttress at the ground line.

Plans for Telltales—The committee recommended that the plans and specifications for one and two-track overhead and side warning telltales of wood construction, submitted last year, be adopted and published in the Manual.

This recommendation was approved.

Ballast Specifications—On its assignment to prepare specifications for ballast and to review specifications of leading railroads to determine their conformity with A. R. E. A. recommendations, the committee submitted a progress report, as information, which discusses current specifications and points out that quality requirements of ballast, such as hardness, strength, durability, etc., are difficult to evaluate. It goes on to discuss in particular the specification concerning soft and friable pieces and suggests that the Los Angeles abrasion test for wear offers some promise in evaluating this characteristic of ballast, but that no suitable adaptation of this test for the larger sizes of ballast has been developed, although a committee of the American Society for Testing Materials is working on the problem.

Ballast Tests—On its assignment to study ballast test methods, the committee describes the Los Angeles abrasion test and suggests that it should be extended to include several more gradations of size which will make it adaptable for the larger sizes of ballast. It also suggests and describes a proposed tamping test, which is combined with repeated load applications to determine the field behavior of ballast, the re-

sults of which could be correlated to Los Angeles abrasion tests.

The report also mentions the soundness, or weather-resistance, test for ballast, and suggests that further investigation should be made to develop a thoroughly satisfactory specification, because some materials that do not fail in service fail in this test. The committee suggests that added personnel and financial assistance, combined with a definite research plan, would greatly speed the research needed to obtain facts upon which the development of better tests and specifications for ballast materials can be based.

Ties

***John Foley**, Chairman**

This committee presented progress reports on five of its eight assignments.

Revision of Manual—Under Revision of Manual, the committee offered for adoption a number of changes in the Glossary. The recommendations of the committee were adopted without discussion.

Tie Renewals and Costs—Following its customary practice, the committee presents tabulations of tie renewals and costs for 1944 and the preceding four years, based on data reported to the Interstate Commerce Commission by railroads in the United States and to the A. R. E. A. by roads in Canada. These tables were given advance publication in Bulletin 453, June-July, 1945.** The report points out that the increase in the number of ties applied in 1944, as compared to 1943, probably reflects the improvement in the man-power situation in 1944, resulting from the employment of imported track labor. It also mentions a decline in the number of secondhand ties reapplied, which it states indicates that more ties are being replaced only after maximum service has been obtained from them.

Control of Splitting—In reporting on its assignment to investigate the cause and control of splitting in railroad ties, the committee submitted a progress report, as information, which describes the Taylor-Colquitt vapor drying process.† By this process, green ties are seasoned artificially in a few hours, and can be given a preservative treatment immediately thereafter. The report states that the effectiveness of the vapor-drying process in controlling the splitting of ties depends on how green they are. Partly-seasoned ties do not lend themselves to vapor-drying. The report mentions that red oak vapor-dried ties in a test track on the Southern show less checking and splitting after two years of service than air-seasoned ties installed at the same time. It also states that if vapor-dried ties split less than air-seasoned ties before and after they are installed in the track, the procedure will constitute a real contribution to a reduction in renewals and will obviate the use of many acres of seasoning yards.

The vapor-drying process utilizes two principles of heat transfer that result in greatly accelerated rates of drying: (1) The use of a relatively high temperature permits a short exposure period so that deterioration of the wood does not take place under the conditions employed. (2) Exposure of the material to condensing vapors accelerates the drying because of the large amount of latent heat liberated by condensation. Furthermore, the process eliminates the chief causes of deterioration of wood between the temperatures of boiling water and thermal decomposition of the wood, which are oxidation and hydrolysis from the action of steam, because the wood is dried in an inert atmosphere of organic compounds.

The report explains that by this process, with a charge of 800 ties conditioned commercially and subsequently given a 60-40 creosote-coal tar treatment, 3,980 gal. of water, or 11.5 lb. per cu. ft., were removed, lowering the moisture content of the ties from 72.6 per cent to 41.0 per cent. It also explains that the ties showed far less checking than air-seasoned ties, but that they did have tiny slits along the medullary rays of the wood, which began ¼ in. to ½ in. below the surface and extended inward ¾ in. to 1½ in., depending upon the drying period. Subsequent tests of strength of green, air-seasoned and vapor-dried ties showed somewhat greater loss of strength for the vapor-dried ties, compared to the air-seasoned ties, probably due to the ray slits.

An alternate treatment was developed to eliminate the ray slits, but ties subjected to this treatment showed a somewhat greater tendency to check and split in track.

Mechanical Wear—With reference to its assignment to study ways and means for retarding the destruction of ties by mechanical wear, the committee submitted as information a brief general discussion of factors affecting destruction by mechanical wear, including the size of rail; the size, type and application of the tie plates; standard of track maintenance; adzing and boring of ties; type of rail joints; continuous welded rail and rail anchors. In conclusion, the report states that the two most important of these factors are, undoubtedly, the tie plates and the method of their application; that the average tie plate now in use, especially on heavy-traffic lines, is too small to protect the tie adequately; and that large tie plates fastened to the ties with screw spikes and spring washers, with 36-in. rail joints or continuous welded rail and a high standard of maintenance, furnish the highest type of protection against mechanical wear of ties. However, it expressed doubt whether the greater cost of such construction is offset by the extended service life of the ties.

Reasons for Removal—Under its assignment to study the reasons for the removal of treated ties, the committee discussed the purpose of this assignment and presented a form to be used in tabulating the various reasons why ties are removed from track. In describing the form, the committee pointed out how it should be used, explaining that the initial cause of the trouble, rather than the physical condition of the tie when removed from the track, should be recorded as the cause of renewal. For example, it said, if a tie has decayed rapidly because it became badly split, the cause recorded should be as "split" and not "decay."

Waterways and Harbors

***Benjamin Elkind**, Chairman**

This committee submitted reports on two of its six assignments, both of which were presented as information.

Flood Control Acts—On its assignment to prepare abstracts of flood control acts and to outline the procedures under them, the committee reviewed briefly the history of the 1928 and 1936 Flood Control Acts and listed the amendments to the latter act. The procedure by which flood control projects are developed and authorized by Congress is also outlined, and the report states that it is of prime importance for interested parties to attend or to be represented at the first public hearing held by a U. S. district engineer on any project. The report goes on to state that under the present A. A. R. zone organization, all railroads interested or affected by a proposed project should receive notices of such hearings.

Steel Casings in Sea Water—With respect to its assignment to study the reasonable life of steel casings immersed in sea water, the committee presented abstracts from a report by C. P. Larrabee of the Corrosion Research Laboratory, Carnegie-Illinois Steel Corporation, on corrosion tests in sea water at Kure Beach, N. C., and also from an article on "The Effect of Macro-Organisms on Metals in Sea Water," by Dr. W. F. Clapp, Duxbury, Mass. These data show that the so-called stainless steels are comparatively resistant to corrosion in sea water, but the committee recommends four precautions for the use of stainless steels in sea water, as follows:

(1) Avoid applications at low velocities (less than 5 ft. per sec.), especially where marine organisms may become attached and promote localized attack.

(2) Avoid crevices which may become the seats of destructive corrosion because of oxygen-concentration cells, and, if crevices are necessary, inhibit corrosion with some material, such as petrolatum.

(3) See that the alloy is properly heat-treated, especially after welding, unless it contains a stabilizing element, such as columbium or titanium.

(4) Favor combinations with equal or larger areas of steel or other less noble metals—for example, zinc—and avoid combinations with copper-base or nickel-base alloys.

In summary, the report states that the attack on all steels in sea water varies with local conditions, and that for plain and low-alloy steels the average rate varies between 0.002 and 0.0077 in. per year. Under most conditions, the substitution of low-alloy steels can only be justified by tests closely

* *Pennsylvania Railroad.*
** *Abstracted in the* Railway Age *of July 28, 1945, page 137.*
† *This process is described in detail, in two parts, in this and the preceding issue of the* Railway Age.

* *Office Engineer, Erie.*

resembling service conditions. The rate of attack between high and low tides varies with the locality, and the pollution of the water, including oil, which may form a protective coating. In warm, humid atmosphere corrosion may be accelerated and, in some tests, corrosion was most severe just above the normal high-tide level. The inclusion of two to three per cent molybdenum in the 18-8 chromium-nickel steels will usually prevent seriously deep pitting, while molybdenum-free steels containing 25 per cent chromium and 20 per cent nickel are reasonably immune from excessive pitting.

The report was received without discussion.

Wood Preservation

This committee submitted progress reports on 3 of its 11 assignments.

Revision of Manual—Under Revision of Manual, the committee recommended several changes for adoption, including corrections of the Glossary and the substitution of new material for pages 17-3 and 17-4 to bring the recommendations for requisitioning treated wood up to date and in harmony with other parts of Chapter 17. Also recommended were the deletion of pages 17-23 to 17-43 and the substitution of new forms for reporting the inspection of wood preserving operations and results, to replace those on pages 17-62 to 17-64, inclusive.

All of these recommendations were approved.

Service Test Records of Treated Wood—Under this assignment, the committee presented tabulations showing the renewal records of ties in the Hemlock test track of the Northern Pacific in Montana.

Termite Destruction and Prevention—In a progress report on its investigation of destruction by termites and possible ways of prevention, the committee presented a detailed report of the termite exposure test at Florissant, Mo. Most of the 2-in. by 2-in. posts used in these tests were placed on May 11, 1939, although several other tests were set up in April, 1940, and arrangements are in progress for installing more test posts early in 1946, treated by a number of compounds not included in the previous tests.

The report tells of the conditions under which the tests were installed and lists by means of tables the detailed results of an inspection on November 2, 1944, for posts treated with celcure, pentachlorophenol, phenyl mercury oleate, ascu, zinc chloride, chromated zinc chloride, Wolman tanalith U, antimite, larvicide, isco, Sharples solution, scafoil, alpha nitronaphthalene, trichlorbenzene, Hooker solvent T, copper naphthenate, and distillate creosote—kerosene.

The principal conclusions of the committee were: (1) That chemicals applied as soil poisons are not as effective as the same chemicals applied by pressure or open-tank methods; and (2) the chemical compounds and methods of application which have been effective in preventing any termite attack are: Copper naphthenate applied by pressure; celcure applied by the open-tank (equivalent to pressure) method; ascu applied by pressure; pentachlorophenol applied by pressure; trichlorbenzene, applied by pouring on the ground around posts, and Hooker solvent T, likewise applied by pouring on the ground around the posts.

Labor Economics

*H. A. Cassil, Chairman**

This committee submitted reports on 2 of its 8 assignments, both of which were final reports, presented as information.

Reduction of Clerical Work and Reports—On its assignment to investigate the economies that can be effected by a reduction of clerical work through the elimination and simplification of reports, the committee stated that the troublesome problem of multiple reports has been rapidly growing worse, accentuated by present-day governmental requirements, and that there is an almost endless field for investigation concerning the responsibility of governmental agencies for much additional clerical work.

As regards the various reports required of the maintenance of way forces, the committee found that there is a wide divergence among the railroads, which indicates that some roads may require more reports than necessary and others less. It found that the clerical work required to fill out the numerous forms and records required in connection with the hiring of new employees has become especially burdensome because of the Railway Retirement and Social Security acts, federal and state income tax requirements, medical examinations, insurance, minor's release, and the need for securing a detailed personal history of each employee. The committee reported that it has studied the possibility of using one composite form, but admitted that it is difficult to get all departments affected to agree to a combination of the data required.

In closing its report, the committee offered the following conclusions, in substance: (1) The co-operation of accounting departments must be enlisted to redesign simplified time, material and other reports to fit into a workable accounting routine. (2) A revision of time, material and other reports may be possible if agreement can be reached with the accounting forces to simplify distribution of costs to a minimum on the basis of appropriate time studies (3) Modern accounting practices do not require as meticulous distribution of costs by primary accounts as in former years, as insufficient use is made of such statistics today to justify the effort and expense. (4) The various departments should endeavor to agree on and use a composite personnel form for all new employees. In this latter regard it is said that the duplicating requirements of the Railroad Retirement Board, the Social Security Board, and the Bureau of Internal Revenue with respect to the withholding tax, likewise demand correction.

Housing and Transporting Maintenance Forces—On its assignment to study methods of housing and transporting maintenance of way forces to reduce the use of motor cars and camp cars, the committee submitted a report based on replies received from 49 roads in response to a questionnaire. In these replies, 25 railroads stated that they use no method of housing other than camp cars; 12 use portable or knock-down houses, including 3, which also use tents; 10 use permanent or semi-permanent buildings of their own, as well as rent others; one road uses portable cook and dining facilities, but houses its men in camp cars, and two of the roads that use portable buildings also use automobile trailers to a limited extent.

The report discusses the manner in which fixed houses and portable houses and tents are used, the size of the facilities, and the cost of the structures. The majority of roads using portable houses reported that they had to resort to them because of the labor emergency, and three-fourths of all the roads using either portable or fixed types of houses said that they are still using camp cars.

Of the 49 replies received, 41 roads reported that they have used trucks and buses for transportation, as well as motor cars, and seven that they have used only motor cars. As regards the types of highway vehicles used, trucks were favored. The report goes on to discuss the types and sizes of gangs transported by trucks and buses; other uses for trucks, which include handling material; trucks owned and rented; and the economies of highway transportation. Concerning the last mentioned item, 69 per cent of the roads replying stated that there is economy in the use of trucks and buses as compared with the use of motor cars.

In its conclusions, the committee said in substance: The use of portable buildings has, in general, been brought about by the labor shortage during the war, and that this can be said also of permanent and semi-permanent buildings in many cases. A majority of the roads are using camp cars exclusively and 75 per cent of the roads using buildings are also using camp cars. Very limited use is being made of auto trailers to house small gangs, but trucks and buses have been used on many roads for transporting practically every class of maintenance of way force, from one man up to gangs of 150 men. The use of trucks and buses has greatly expanded during the war, and definite economies are to be obtained by their use, particularly where the density of traffic causes excessive delays when using motor cars, or when transporting forces that must travel long distances or that must make use of infrequent trains. Where this equipment is used, it should be a part of a well laid-out plan of organization and operation. The economy will vary with conditions, but one road estimates its savings as 25 to 100 per cent on 80 owned trucks after allowance is made for cost of operation, repairs, interest and depreciation.

The report was received without comment.

* *Chief Engineer, retired, Pere Marquette.*

Rail

*W. H. Penfield, Chairman**

Reports were submitted by this committee on 9 of its 13 assignments, all of which were progress reports, and appended to the report as a whole the Twelfth Progress Report of the Joint Investigation of Failures in Railroad Rails in Service and Their Prevention.

Revision of Manual—Under Revision of Manual, the committee submitted for adoption and publication a number of changes in the Glossary, minor revisions of forms and figures, and a recommendation that Section 206, Recommended Practice for Rail Inspection, be eliminated. Also recommended were new specifications for heat-treated carbon steel and alloy steel track bolts, to include both wrench fit and hand-free fit bolts, and the elimination of the specifications for open-hearth steel girder rails of plain, grooved and guard types.

Under this assignment, the committee also submitted completely revised specifications for open-hearth steel rails to be substituted for those now appearing in the Manual on pages 4-57 to 4-69, inclusive. Most of the revisions in these specifications were minor, with the exception of an added section on control cooling.

All of the recommended revisions in the manual were adopted without discussion.

Rail Failure Statistics—In accordance with customary practice, this portion of the report includes several compilations of rail failure statistics prepared by W. C. Barnes, engineer of tests of the committee. These statistics are reported in the form which was initiated last year and which places special emphasis on the performance of the control-cooled rail.

The report states that 38,708 fissure failures were reported in 1944, of which 31,781 were detected and 6,927 occurred in service. It would appear, the report adds, that the reduction in number of fissure failures is probably due to the increased proportion of control-cooled rail in heavy-traffic main lines, although there is a possibility that extensive detector car testing in recent years is gaining control of the failure rate.

Continuous Welding—On this assignment, the commitete presented tabulations summarizing installations of continuous welded rail to date; additional installations of continuous welded rail; a summary by welding processes of installations in tunnels and in the open, showing the number of welded joints and failures; and a tabulation of additional failures in 13 installations.

Service Tests of Joint Bars—Reporting on its assignment to make service tests of various types of joint bars, the committee presented an extensive annual report, as information, complete with tables and charts, covering the service performance to date of 9 different types of 112-lb. joint bars that it has under observation on the Atchison, Topeka & Santa Fe, and 12 different types of joint bars under observation on the Pennsylvania. Observations have been continued, and the principal measurements include (a) joint camber on the rail head, (b) rail surface profile, (c) out-to-out distance of bars, and (d) bolt tension.

With reference to these tests, the committee concludes that the performance of end-hardened rails in both the Santa Fe and Pennsylvania tests, for all types of joints, is outstandingly better than that of unhardened rails. The rates of rail head wear are so low that none of the rails should have to be removed from tangent track for many years due to that cause. Longer service life may be expected with 36-in. bars than with 24-in. bars, but relative performance cannot yet be definitely evaluated. There is no appreciable difference in the performance of controlled-bearing and full-bearing bars of similar design. The performance of headfree bars, with the exception of one location, is as good as that of head contact bars of comparable section and length. In the Pennsylvania tests, the relatively light weight section F-4 bar compares quite favorably with the much heavier B-19 and A.R.E.A. bars.

Joint Bar Failures—With reference to its assignment to investigate joint bar failures and give consideration to the revision of design and specifications, the committee reviewed the joint-bar test on the Chicago, Burlington & Quincy, near Ft. Morgan, Colo., to compare the effectiveness of improved metallurgies in resisting the development of progressive cracks at the upper fishing surface of the joint bars near the rail ends.

Appended to this report, the committee submitted the fourth progress report on the rolling-load tests of joint bars being conducted at the University of Illinois under the direction of N. J. Alleman, special research professor of engineering materials. This report, in the form of a monograph by Professor Alleman, concludes that the rail fishing surfaces are distorted by hot sawing of rail ends, thereby reducing the fishing height in the vicinity of the rail end. Test results indicate that the condition of the rail end, whether hot or cold sawed, or bevelled, has an appreciable influence on the fatigue life of joint bars, and that shell steel and high-manganese bars are satisfactory if not too hard. The report also suggests that studies should be directed towards the metallurgy of a joint bar steel of reduced notch sensitivity and to improve the pinched conditions of rail ends.

Corrugated Rail—Concerning its assignment to study the causes and remedy of corrugated rail, the committee submitted a report by Professor R. E. Cramer, special research associate professor, on an investigation of corrugated rails made by him in 1945 at the University of Illinois. This report describes research to determine the hardness and metallic structure of the high, shiny spots in corrugated rail, and experiments with flame tempering of these high spots on freight tracks of the Illinois Central, by means of which the hardness was softened and the corrugations disappeared under traffic.

Fractures Under Engine Burns—Under its assignment to study the development and characteristics of fractures under engine burns in rail, together with investigation as to the effectiveness of welding such burns, the committee offered a progress report, submitted as information, which reviewed tests in rolling-load machines of 29 rail specimens, some of which had engine burns not welded, some engine burns which had been welded, and others engine burns with fractures beneath them, which had not been welded. In summary, the report states that no conclusions can yet be drawn, but that it appears that a rail containing an engine burn from which a detail fracture has started is likely to fail and should be removed from track, and that the welding of engine burns results in improvement and may be expected to give reasonably good service.

Shelly Spots and Head Checks—Reporting on its assignment to investigate the causes of shelly spots and head checks in rail surfaces for the purpose of developing measures for their prevention, the committee submitted a progress report, offered as information, to which are appended reports on field research by the Engineering division and a fourth progress report of the shelly rail studies at the University of Illinois.

The committee report states that definite conclusions are not warranted at this time, but offers a few comments, as follows: No definite relationship is indicated between mill chemistry and shelling, except as the hardness of the running surface is affected. Tests show about the same shelling and flaking with or without rail lubricators. Transposing shelly rails from the high to low rail on curves is well worthwhile, if done in time. Tests indicate little, if any, advantage for slow cold rolling. Tests of special rails indicate that shelling may be retarded somewhat by the use of high-carbon rail and heat-treated rail. The three per cent chromium rails laid on curves in August, 1944, and April, 1945, are in excellent condition.

Concerning the studies of the Engineering division research staff on this assignment, the report mentions a number of installations of rail with a modified head contour, which indicate that some benefit may be realized, although the tests are not old enough to form an accurate opinion on results.

Field Research on Shelly Rails—The fourth progress report on that portion of the shelly rail studies assigned to the Engineering Division research staff is appended to the above report and presents data pertaining to rail shelling from tests made on 131-lb. rail on the Norfolk & Western in 1945. This report describes extensive stress measurements which were taken by means of strain gages on the outside rails of six-degree curves on both westbound and eastbound tracks under regular traffic. The traffic on the westbound track amounted to about 60,000,000 tons per year, and was mostly coal carried in 55, 70 and 90-ton cars. The outer rails on the westbound track have tended to develop shelling as bad as the rail on any curve on the Norfolk & Western, while the outer rails on the eastbound track have not been susceptible to shelling.

Stress measurements were made on the rail web and fillets in these tests, but no significant differences were found between the maximum stresses obtained on the two curves to explain shelling on one and not

* *Chief Engineer, Retired, C. M. St. P. & P.*

on the other. The measured stresses were higher under the loaded cars, but the magnitude of maximum stresses under loaded coal cars was only about one-half as great as under the individual wheels of locomotives.

It is believed that measurement of the internal strains developed by traffic at the gage corner of the rail would provide helpful information, but no known technique yet exists for doing this. However, the stresses producing shelling might be somewhat the same at the rail end as elsewhere, and shelling has been found at rail ends. Accordingly, another series of tests was conducted, in which strain gages were attached to one end of a 131-lb. rail, which was placed in the outside rail of the six-degree westbound curve described above.

The report states that these tests were exploratory in nature, but that several facts of interest were brought out, which are summarized briefly as follows: High residual stresses are developed at points where actual dynamic stresses are well below the yield point. The repetition or reversal of dynamic stresses was not sufficiently high to indicate fatigue failure in the area where shelling develops, but accumulated residual strains were quite high in this area. This suggests the possibility that shelling may be the result of exhausted ductility due to excessive plastic flow and high residual strains, rather than fatigue of metal from repeated or reversed stresses.

Laboratory Research on Shelly Rails—Also appended to the above report is the fourth progress report of the shelly rail studies at the University of Illinois, in the form of a monograph by R. E. Cramer, special research associate professor of engineering materials of the university, which reviews the special rolling-load tests to produce shelling and summarizes the results of observations on four curves on the Chesapeake & Ohio. The report also mentions an inspection of three-per cent chromuim rails laid in three curves on the Norfolk & Western.

Developments in Rail Design—Under its assignment to investigate recent developments affecting rail design the committee submitted an extensive report containing mention of stress measurements on 131-lb. rail on the Norfolk & Western, a detailed report of a rail design study, and a laboratory report on fatigue strength of rail web specimens. These reports were all submitted as appendices.

The study of rail design and tests on modified rail sections was conducted at the Northwestern Technological Institute, Evanston, Ill., by the research staff of the Engineering division, A.A.R., by E. E. Cress, assistant research engineer, under the general supervision of G. M. Magee, research engineer. This report describes in detail the strain gage tests made on seven rail designs to determine principally web and upper fillet stresses under various types of loading, and the effect of design modifications in reducing stresses. The rail designs used were 112-lb. R. E., 114-lb. study section G, 113-lb. study section H, 112-lb TR (torsion resisting), of the Chicago, Burlington & Quincy, 131-lb. RE, 132-lb. study section U, and 133-lb. study section V. The rail test specimens were 7½ ft. long and were mounted on five sawn ties 18 in. long, which were supported on a Celotex mat, thereby closely approximating the resiliency of ideal track conditions. Strain gages were placed in the upper web fillets at various heights on the side of the web, and on five of the rails three strain gages were placed in the lower web fillets. Tests were made with a 40,000-lb. vertical load applied at various positions on the head, with the rail assemblies mounted on flat-seated tie plates and on rolled-crown tie plates, both of which had a 1 in 40 cant. Tests were also made with the rail assemblies tilted by tapered wood blocks to a 1 in 4 cant.

The report states that for a given eccentricity of load the stresses in the upper fillets and upper portion of the web are the same for all practical purposes, irrespective of whether the vertical load is combined with a lateral load or acts alone, or whether the flat-seat or rolled-crown tie plates are used. The important factors are the magnitude of the vertical load and the amount of eccentricity. As pointed out in last year's report, however, stresses in the lower web fillets and outer portions of the base flanges are greatly increased by the use of rolled-crown plates.

All the modified rail sections showed a substantial reduction in maximum measured stresses in the upper fillets. In fillets with ½-in. or longer radii, the maximum stress occurred well below mid-arc and remained high down to the connection with the web. As the 131-lb. RE rail has a ½-in. upper fillet radius, it is more difficult to reduce the fillet stress by design modification in as great a ratio as for modifications of the 112-lb. rail, which has a fillet radius of ⅜-in.

In conclusion, the report states that, in the design of upper web fillets, either a simple long fillet radius (adaptable only with headfree joint bars) or a spiraled or compound curvature with long lower radius (adaptable with either headfree or head-contact joint bars) will decrease the maximum fillet stresses.

Appendix C to this report is a progress report by R. S. Jensen, special research associate of engineer materials, University of Illinois, which describes a series of fatigue tests made to determine the effect of stamped figures on the web strength of rails.

Twelfth Progress Report on Rail Failures—Also appended to the report of the Committee on Rail is the Twelfth Progress Report of the Joint Investigation of Failures in Railroad Rails in Service, and Their Prevention, which is being conducted by the Engineering Experiment Station, University of Illinois, in co-operation with the Association of American Railroads through the Committee on Rail, and with the rail manufacturers through the Technical Committee on Rails of the American Iron and Steel Institute. Beyond the introduction, this report consists of three parts—a final report of service tests on end-hardened rails on the Chesapeake & Ohio, at Carey, Ill.; a study of control-cooled and Brunorized rails which have failed in service; and a report on the control cooling of three-per cent Chromium and of intermediate-manganese rails.

The final report on end-hardened rails on the C. & O. contains the following conclusions: There is a decided reduction in batter with end-hardened rails; rails quenched with water developed weeping cracks, and only a very few such cracks develop in air or self-quenched rails; the average Brinell hardness of rail ends which have not required welding was in the range 361 to 374; and rail ends made too hard and then rehardened to a lower hardness developed many weeping cracks. The report also submits proposed recommendations for hardening rails.

Masonry

***A. N. Laird,** Chairman**

This committee submitted a progress report on 1 of its 9 assignments—Revision of Manual—in which it recommended numerous deletions and revisions of terms and definitions in the Glossary, and also a number of changes in the specifications for concrete and reinforced concrete railroad bridges and other structures. Among the latter changes is one calling for the withdrawal from the Manual of Emergency Specifications for Portland Cement, A. S. T. M. designation EA-C 150, and Standard Specifications for Portland Cement, A. S. T. M. designation C 150-42, substituting therefor Standard Specifications for Portland Cement, A. S. T. M. designation C 150-44.

All of these recommendations were approved.

Wood Bridges

***S. F. Grear,** Chairman†*

This committee submitted progress reports, as information, on 3 of its 10 assignments.

Fastenings for Timber Trestles—Reporting on its assignment to study specifications and design of fastenings for timber trestles, including metal joint connectors, the committee presented tentative specifications for comment and criticism before offering them next year for inclusion in the Manual.

Renewing Creosoted Timber, Ballasted-Deck Trestles—The report on this assignment first discusses the considerations involved in the renewal of the creosoted timber ballasted decks of pile trestles, especially when necessitated by a raise of grade. It then submits a detailed plan of procedure for the renewal of such decks when the raise of grade is more than 6 inches, which it recommends be followed to maintain the highest speed of trains and to permit the economical use of mechanical equipment. The report also includes a drawing showing a method of cribbing the track to the new grade, which uses secondhand stringers bolted together in such manner as to effect openings in the

** Bridge Engineer, Grand Trunk Western.*
† Assistant Engineer of Bridges, Illinois Central.

cribs at the new bent and cap locations. The plan of procedure outlines a method of cribbing to raise the track to the new grade, and presents a recommended practice for driving the piles for new bents and for capping the piles and placing the new stringers and deck, while at the same time removing the old.

Pile Piers for Long Spans—Under its assignment to study the design of creosoted timber pile piers for long spans, the committee presented two preliminary plans of piers for a 150-ft. span, with approaches, intended for Cooper's E-60 loading.

The entire report was received without comment.

Electrolytic Corrosion

A third progress report on the investigation of electrolytic corrosion of steel in concrete was published in January, 1946, (Bulletin 457). This work has been under the general supervision of the Electric Section (A. A. R.) Committee on Electrolysis, of which A. E. Archambault, assistant engineer, New York Central is chairman. Randon Ferguson, electrical engineer of the Engineering division research staff has been in charge of the tests under the direction of G. M. Magee, research engineer.

This report describes the progress made in special field tests to determine resistance to ground, amount of current flow, and corrosion of steel embedded in different thicknesses and kinds of concrete under controlled conditions in the field, and also includes a description of its inspection of two catenary pedestals on the Illinois Central.

These special field tests were started early in 1944 and involved 31 concrete cylinders seven feet long, of various diameters and types of concrete, some unprotected, some steel-encased, and others protected with asphalt coatings. These cylinders, each of which contained a six-foot steel rod longitudinally through its axis, were buried vertically in the ground near the Illinois Central tracks at 23rd street, Chicago, and were subjected to 25 volts direct current, with the exception of two samples, which were subjected to 40 volts of alternating current. The samples were observed from time to time and the current flow was checked, with some rather surprising results.

By July, 1945, it was quite evident that most of the concrete specimens had suffered considerable damage as a result of electrolytic action. The above-ground portion of the plain concrete, small-diameter cylinders had completely broken away from the steel electrodes. Specimens of larger diameter were still intact, but showed well-defined cracks radiating outwardly from the electrodes, due to the expansive force resulting from electrolytic corrosion of the electrodes. All of the plain concrete specimens subject to the direct current potential developed these cracks, regardless of the mix or admixture used.

The report states that it is apparent that tremendous expansive forces were set up by the electrolytic corrosion of the steel electrodes. Even the specimens encased in the steel pipe developed small cracks, radiating from the electrode. The specimens covered with asphalt waterproofing and the specimens subjected to alternating current appeared to be in perfect condition.

Concerning these tests, the committee concluded that increasing the thickness of concrete around the electrodes reduced the rate of electrolytic corrosion but did eliminate cracking. Concrete admixtures were not effective in controlling electrolytic corrosion. The presence of a steel covering reduced the rate of electrolytic corrosion but did not effectively eliminate it and resulted in some deterioration in strength of the concrete. A covering of asphalt membrane waterproofing provided an effective means of eliminating electrolytic corrosion of reinforcing steel and deteriorization of the concrete. The electrical potential caused surface deterioration of the concrete on all uncovered specimens subjected to direct current, but the presence of some cinders in the soil surrounding the specimens may have been a factor.

The remainder of the report contains notes on the inspection of two cantenary foundations on the Illinois Central and an appendix by Dr. L. S. Brown, petrographer, Research Laboratory, Portland Cement Association, describing laboratory research on the concrete in the cylinders of the field test described above.

Impact

***C. H. Sandberg,** Chairman**

Brief progress reports, offered as information, were submitted on 5 of its 8 assignments by the Committee on Impact and Bridge Stresses. These reports mention tests of columns in a viaduct on the Detroit, Toledo & Ironton, at Toledo, Ohio; tests of a 110-ft. through girder span and of a 47-ft. deck girder span, both with ballasted timber floors; tests of the dynamic shear in the web plates of the same two girder spans and measurements of the strains in the main and web members of several open-floor truss spans; and tests of impact in the columns and hangers of the same truss spans. On the last mentioned tests the data is now being assembled and analyzed. The report also mentions exploratory tests on its assignment to study the Determination of Stresses and Impacts in Timber Stringer Bridges, on which the committee is collaborating with the Committee on Wood Bridges and Trestles.

Summarizing some of the advance conclusions of the committee as the result of its tests on steel bridges on individual roads, Chairman Sandberg said, in part, as follows:

"(1) The impact in floorbeam hangers is about the same as that recorded in short beam spans, but the bending stresses resulting from floorbeam and stringer deflections are about as great as the combined static line loads plus impact stresses.

"(2) The recorded static stresses in some truss members are as high as 30 per cent greater than the calculated stresses, while in other members the static stresses are appreciably lower. Usually the static stresses in the lower chords of through spans are reduced by stringer action, while the upper chord stresses are increased.

"(3) The impacts in truss spans are greater than the present A. R. E. A. design impact allowance. The impacts reach a maximum at the critical speed and then become smaller with a further increase in speed.

"(4) There is considerable variation in the stresses between the eye-bars of any one member. It has been found that one eye-bar of a two-bar member carries as high as 97 per cent of the total live load in the member."

* *Assistant Bridge Engineer, Atchison, Topeka & Santa Fe.*

Iron and Steel Structures

***J. E. Bernhardt,** Chairman**

The report of this committee was confined to a number of recommendations under Revision of Manual, involving changes in specifications for steel railway bridges, which were submitted for adoption.

All of these changes were approved.

Research on Welded Structures—A progress report, published in Bulletin 454, October, 1945, describes the extensive research program being carried out to determine the fatigue strength of various welded structures. This program is being sponsored by the American Welding Society and the American Institute of Electrical Engineers and, on the recommendation of the Committee on Iron and Steel Structures, is being participated in by the Association of American Railroads. The report by the Committee on Fatigue-Testing (Structural) describes briefly some laboratory tests at the University of Illinois on rolled beams, with and without welded or riveted cover plates. Special attention is directed to the reduction in unit fatigue strength for the welded-on cover plates, especially the large reduction for the partial-length cover plates.

This report was supplemented by an illustrated address by Professor W. M. Wilson, University of Illinois, on the fatigue testing of welded structural members, as reported on earlier in these pages.

Track

***I. H. Schram,** Chairman†*

This committee submitted reports on 7 of its 11 assignments, all of which were progress reports, except Revision of Manual.

Revision of Manual—Under this subject, the committee submitted for adoption a number of changes in specifications on rail tongs for use with cranes, specifica-

* *Bridge Engineer, Chicago & Eastern Illinois.*
† *Chief Engineer Maintenance of Way, Erie.*

tions for a track gage with wood rod, and changes in the Glossary.

All these changes were approved.

Track Tools—Reporting on its assignment to study plans and specifications for track tools, including their repair and reclamation, with recommended minimum limits for reclaimed tools, the committee submitted for adoption and publication combined specifications for ash and hickory handles for track tools.

These specifications were adopted.

Switches, Frogs, Crossings, Etc.—Under its assignment to study plans for switches, frogs and crossings, collaborating with the Signal Section of the A. A. R., the committee submitted a preliminary report in June, 1945, (Bulletin 453) describing tests with four designs of solid manganese frog castings, installed to permit the study of the cause of cracks in the flangeways. The committee also recommended for adoption a number of revisions of plans in the Portfolio of Trackwork Plans and the withdrawal of the Emergency Provisions covering these plans, adopted on March 19, 1942.

These recommendations were approved.

The tests on solid manganese frog castings consisted of measurements under regular trains of the stresses occurring in the frogs of a crossing of the Baltimore & Ohio Chicago Terminal and the Atchison, Topeka & Santa Fe, at McCook (Chicago), Ill. The four frogs tested represent substantial differences in design, although all the frogs were constructed for the same location in the same crossing, which has an angle of 75 deg. 48 min.

Before the tests were made, additional ballast was placed and the crossing was tamped and put in good condition. The stresses were measured with Baldwin-Southwark SR-4 type wire resistance strain gages. The castings were tested one at a time and when the test of one casting was completed it was removed and replaced with a different design. One casting was also tested in a second series of tests, with the base plates removed and using a different tie arrangement.

Strain gages were placed to measure fillet stresses in the flangeways and also at other points where cracks had been occasionally found to occur in service. Twenty gage positions were used. Tests of the four castings were secured under 490 trains between August 14 and September 18, 1944. In analyzing the records, the maximum tension and compression stresses under the locomotive and tender were determined and records were also taken under several cars following the locomotive.

A study of the test results indicates that at only three of the gage locations was the range of stress high enough to indicate the probability of fatigue failures. These were in the flangeway fillets at the two receiving corners of the frog and at one intersection of the base flange. The test data showed that tension stresses were produced by the upward flexing of the casting between wheels, and that peak compression stresses of short duration were produced by the impact of the wheel as it crossed the flangeway and struck the receiving tread.

Stresses in Tie Plates—The committee submitted two reports, one a preliminary report in June, 1945, (Bulletin 453) on laboratory tests to determine the influence of the shape of the tie plate rail seat on rail stresses, and a later report in February, 1946, (Bulletin 458) on field research on the Southern, near Chattanooga, Tenn.

The laboratory tests with flat-seat, beveled-seat and rolled-crown tie plates were conducted in the civil engineering laboratory of the Northwestern Technological Institute at Evanston, Ill., by the research staff Engineering division, A. A. R., under the direction of G. M. Magee, research engineer, to determine the influence of the shape of the tie plate rail seat upon the vertical stresses in the lower rail fillets and longitudinal flexural stresses in the rail base flanges, and thus the type of rail seat most favorable to stresses in the rail.

A rail assembly was set up on the steel and concrete floor of the laboratory and, by shifting the assembly, the load could be applied at any point on the top of the rail. The rail assembly consisted of a 112-lb. RE rail 19½ ft. long, supported by 11 yellow pine ties, 6 in. by 8 in. by 18 in. long, spaced on 21-in. centers, all of which rested on a 2-in. continuous Celotex mat 24-in. wide, which furnished a support closely corresponding in elasticity to that of moderately stiff track.

Three 112-lb. tie plates—a flat-seat plate, a beveled-seat plate and a rolled-crown plate—were tested, all of which were double-shoulder, flat-bottom plates with approximately 1 to 40 cant. In making the tests, each of the three plates was placed in succession on the middle tie and a 40,000-lb. vertical load was applied on the center of the rail head successively over the center of the test plate, then over one edge, then over the middle of the adjacent space between ties, and then over the middle of the next tie. In addition, blocks having a slope of 1 to 4 were placed under the ties and the series of tests was repeated to get a lateral component of load amounting to 9,000 lb. toward the outer shoulders of the test tie plates.

Five strain gage lines were established on the rail to measure the distribution of stresses in the lower rail fillets and rail base flanges. In addition, nine strain gages were placed on the bottom of each test plate, one under each corner of the bearing area and five along the center line of the plate under the bearing area.

The tie plate stresses were of moderate magnitude for all test conditions, while the maximum stresses developed in the rail base flanges and fillets showed a considerable difference for the different types of test plates. In general, the rail stresses were highest with the rolled-crown plate and lowest with the flat-seat plate. The report concludes that longitudinal rail base flange stresses are considerably greater, and lower rail fillet stresses moderately larger, with the rolled-crown plate than with flat or beveled-seat plates; that rail stresses were somewhat lower over the flat-seat plate than over the beveled-seat plate; and that the rail seat should be flat over as much of the tie plate width as possible, but that plates should have enough bevel at the side to avoid the sheared edge contacting the rail base.

The field tests on the Southern were also conducted by the research staff, Engineering division, A. A. R. The purpose of these tests was to obtain data on stresses developed in the tie plates; localized stresses in the rail base and in the lower rail fillets over the tie plate bearing surface; and the effect on mechanical wear of ties and maintenance of gage of the various designs of plates.

The tests were carried out on both tangent and curved (6 deg.) track laid with 131-lb. rail. Eight different designs of tie plates were used in the tests, which were selected for the purpose of developing information rgarding the effect of tie plate thickness, length, amount of eccentricity and type of rail seat. Stress measurements were taken on several tie plates of each design for a considerable number of train movements to arrive at average values that would be representative of the effect of tie plate design. These measurements were made by means of Baldwin-Southwark SR-4 electrical wire resistance strain gages and two 12-element oscillographs.

The report concludes that relative evaluation of certain features of tie plate design, such as length, thickness and eccentricity, can not well be made from the stress measurements. This can best be made from measurements now in progress of the wear of ties under tie plates and the permanent bending of plates after sufficient service. These stress measurements have confirmed laboratory data on higher localized stresses in the rail base flange and lower fillets on rolled-crown plates, compared with flat-seat plate. Further analysis of the measurements may furnish data on maximum tie plate load for the types of locomotives tested, which will be useful for the purposes of tie plate design.

Welding Manganese Castings—On its assignment to study the welding of manganese castings in special trackwork, collaborating with the Committee on Maintenance of Way Work Equipment, the committee submitted a progress report on the observed service performance during the year of the special test castings on the Chicago, Milwaukee, St. Paul & Pacific, at Mannheim, Ill., and on the specially-welded frogs on the Toledo Terminal, at Toledo, Ohio. A detailed description of these two tests and of the results to date was submitted by the committee in its report last year, together with tentative conclusions, which have not been changed by the results during the last year.

Joint Lubrication—On its assignment to study the effect of lubrication in preventing frozen rail joints, the committee submitted a progress report, presented as information, describing a test installation on the westbound main track of the Chicago, Burlington & Quincy, near Earlville, Ill., which was laid with new 131-lb. rail in July, 1945. The overall length of track involved in the test is 5 miles, and the north rail has 36-in. 6-hole headfree joint bars, while the south rails are joined with 6-hole head-contact joint bars. Each test section is ½-mile long, so the two rails provide twenty ½-mile test sections. Eight types of lubricants were applied to the joints in the test sections on both rails. No lubricant was applied on one section on each side, and one lubricant already applied on two other test sections was applied with recessed nuts and no spring washers.

Placing Anti-Creepers—The commit-

tee submitted a progress report on rail anchorage tests at two locations on the Chicago, Milwaukee, St. Paul & Pacific and at one location on the Illinois Central. These tests have been described in previous reports of the committee and the present report brings the information on the tests up to date.

Concerning the rail anchorage tests on the Milwaukee, near Mauston, Wis., the report states that only two methods, H and I, of the original nine methods of anchorage have shown superior performance, and concludes that no conclusions can yet be given with respect to the advantages of an increased number of rail anchors or the number required to prevent rail creepage for the conditions of track and traffic at this test.

With reference to the Illinois Central tests near Kankakee, Ill., the report states that, based upon test measurements to date, methods B and C have been least satisfactory and methods F. G, H and I the most satisfactory.

With reference to the Milwaukee tests near Kansasville, Wis., (single track), the committee states that it is quite evident that rail anchorage on single track carrying traffic in both directions is considerably different from that on multiple tracks carrying traffic in only one direction. It seems evident that anchorage must be applied to resist rail movement in both directions, and that it is desirable to box the anchors on each side of the tie so there will be restraint to movement immediately, irrespective of which way the rail tends to move.

Records and Accounts

***H. L. Restall,** Chairman**

Reports were submitted by this committee on 4 of its 10 assignments, all of which were offered as information.

Bibliography—Following usual practice, the committee presented a bibliography of pamphlets and articles dealing with records and accounts published during the period November 1, 1944, to November 1, 1945.

Regulatory Bodies and Courts—The report of the committee contains the customary review of developments during the year in connection with regulatory bodies and courts. Reference is made to the use of property records and reports built up as a consequence of the federal valuation work for the preparation of depreciation schedules, for the determination of the service life and salvage value of roadway property, and for the determination of the depreciation bases and rates for accounting and income tax purposes. The use of these records, it said, has made possible compliance with certain accounting orders of the I. C. C. with a minimum of expense. Reference is also made to the work of the I. C. C Bureau of Valuation in bringing inventories for carriers forward to later dates than 1927, which work is approximately 67 per cent current, and in revising land valuations to current dates, of which work approximately 75 per cent has been completed.

Concerning court decisions, no outstanding valuation cases were decided by the U. S. Supreme Court during the year, but the committee report reviews briefly two cases in lower courts involving depreciation accounting and determination of accrued depreciation.

Depreciation Rates—In its report on the development of service lives and rates for depreciation accruals in compliance with I. C. C. accounting orders, a memorandum of the Bureau of Accounts, dated October 5, 1945, is reproduced, and the committee explains that this circular relieves the carriers of the necessity of submitting detailed studies of service lives and salvage values so long as the carrier is satisfied with and continues to use the rates furnished by the Bureau of Valuation.

In connection with this subject, the report also reproduces, as Appendix A, the full report of a special subcommittee to the General Committee, Accounting division, A. A. R., on Trends in Depreciation Practices, which includes a resumé of I. C. C. accounting regulations covering depreciation accounting and definitions of depreciation by the Supreme Court and various regulatory bodies. This report also reviews I. C. C. rulings on determination of "Original Cost" and "Original Cost as Found by the Bureau of Valuation." It contains a similar review of various rulings and modifications concerning the determination of past accrued depreciation and also discusses depreciation accounting from the standpoint of federal income and excess-profits taxes, and war-time amortization on equipment and roadway property where necessity certificates were granted by the War and Navy Departments or the War Production Board. In conclusion, this report states that the subcommittee does not endorse many of the theories advocated by the I. C. C. with respect to depreciation accounting, and particularly with respect to roadway property, and added that the railroads have not had enough experience with this phase of depreciation accounting to reach a definite conclusion.

I. C. C. Accounting Classifications—In its assignment to keep the association advised of changes in and revisions and interpretations of I. C. C. accounting classifications, the committee followed its customary practice of listing the orders of interest to engineers, issued by the I. C. C. since its last report, including the new and revised rulings of the Bureau of Accounts.

Avoiding Duplication of Reports—An assignment of the committee is to study methods for avoiding duplication of reports and for simplifying and co-ordinating work under the requirements of the I. C. C. and other public authorities. Under this assignment, the report reproduces, as Exhibit A, the full report of an A. A. R. joint committee consisting of representatives from the Operating-Transportation division, the Construction and Maintenance section and the Accounting division, entitled, Report on Analysis of Statistical Information Relating to Operating Costs Useful for Managerial Purposes. This detailed report reviews the basic purpose of statistics relating to operating costs and presents an analysis of such statistics for managerial purposes. It states that much statistical cost information is produced on the railroads, but that if the statements do not aid in controlling or reducing expenses, the cost of their production is wasted.

The report begins by discussing the purpose, preparation and use of statistics. This is followed by an analysis of railroad operations in which it is explained that efficiency of operation can be determined by a comparison of statistical averages and comparison of costs. Comparison of costs may be made by accounts by departments, and by costs of units of work performed. The report then discusses in detail methods of making a comparison of costs, including a section describing the unit-cost system for promoting the efficiency of track forces, in which numerous forms are reproduced as exhibits.

In conclusion, the committee states that, although its purpose is to assist in the reduction of paper work, it must be recognized that important controls are exercised by management through the medium of reports, which supplement direct checks and observations in guiding railway officers in their efforts to curtail expenses. The (A. A. R.) committee believes that reports should be and can be simplified to a point where they will furnish only the basic data necessary for such guidance.

The report was received without discussion.

Waterproofing

***J. A. Lahmer,** Chairman**

This committee submitted reports on 2 of its 3 assignments, including a progress report on Revision of Manual, which recommends several changes in definitions now appearing in the Glossary.

These changes were adopted.

Waterproofing of Railway Structures—The committee submitted a final report on two phases of comparative tests of waterproofing asphalts and coal-tar pitches, not completed at the time the report on other comparative tests was made in 1944. This report presents the results of tests to determine the effects of aging, and also the results of water permeability tests.

The outdoor weathering (aging) tests, which were discontinued on August 1, 1945, indicated that the coal-tar pitches were no longer affording full protection, while the asphalts were in fair condition and the remaining film was still affording good protection to the metal. In the water permeability tests, all the bitumens except one, an asphalt, afforded a perfect seal, and the report states that the committee was unable to offer an explanation for the failure of the one bitumen. The report concludes that the aging tests indicate that the coal-tar pitches were practically useless as a protective material, but points out that the conditions of this test were more severe than would be encountered in the ordinary use of these materials for waterproofing purposes.

* *Valuation Engineer, Maine Central.*

* *Senior Assistant Engineer, Missouri Pacific.*

N. R. A. A. *Again Passes Annual Exhibit*

W. J. Hanna
President

Many conditions combined to necessitate elimination of show that has been of such interest and value to both engineering and maintenance officers for almost 40 years

C. H. White
Secretary

DESPITE the earnest desire of the National Railway Appliances Association to hold an exhibition of railway materials, supplies and equipment this year in connection with the meeting of the American Railway Engineering Association, and the hope of the members of the latter association that this would be possible, there were numerous reasons why it could not be done. What these obstacles were are set forth in the accompanying letters from the president and secretary of the N. R. A. A. This will be the fourth successive year that the cancellation of the exhibit has been found necessary.

Offers Co-operation

*By W. J. HANNA**

When hostilities in World War II ceased last August, the officers and directors of the National Railway Appliances Association gave immediate consideration to the advisability of holding an exhibition, as has been our custom, in conjunction with the annual meeting of American Railway Engineering Association. An intensive study was made, lasting for several months, during which time all conditions affecting such an exhibition were weighed very carefully. These studies established several facts very clearly—our members would not be in a position to prepare exhibition materials in keeping with their best standards; the railroads should not be burdened with the additional freight and passenger business; and our visiting members should not be scattered in hotels within a radius of thirty-five miles of the convention center, since there were no accommodations for them in one place in Chicago. Our officers and directors were unanimous in agreeing that no exhibition should be held in 1946.

The men charged with the affairs of our association understand to a marked degree the problems, both political and economic, that confront not only the railroads but railway supply companies at present, and believe that these difficulties will be intensified in the future. The situation calls for co-operation never before attained, and we as an Association, as well as individual manufacturers, are more than ready to co-operate with and support the railroads as a whole, and particularly the American Railway Engineering Association. We know you have done a splendid job and are confident of your ability to meet your future problems.

Anxious to Help

By C. H. WHITE†

While the National Railway Appliances Association has held no exhibition since 1942, we have attempted to keep abreast of the times and are looking forward with a great deal of anticipation to our 1947 meeting and exhibition, concurrent with the meeting of the American Railway Engineering Association. In his message, our president, Mr. Hanna, has stated the good and sufficient reasons for omitting the exhibition in 1946.

While we congratulate the engineering departments of our American railroads on the tremendous and most successful job they did during the war, and have been doing since, our individual members can take pardonable pride in the contribution each has made in the same effort.

Regardless of the difficulties in the past, as we see it, the railroad problems of the future will present even greater difficulties, but we are sure that the spirit of co-operation which has carried us through to the present will assure success for the American railroads and the railroad supply manufacturers in the future. It is to this task that our association has dedicated itself, with the hope that our assistance and co-operation will be of distinct benefit to the railroad engineering fraternity.

Board of Directors
N. R. A. A.

President
W. J. Hanna, Republic Steel Corporation, Chicago.

Vice-President
C. D. Young, Metal & Thermit Corporation, Chicago.

Secretary
C. H. White, Industrial Brownhoist Corporation, Chicago.

Treasurer
V. E. McCoy, National Aluminate Corporation, Chicago.

Honorary Directors
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R. B. Fisher, Buda Company, Harvey, Ill.
J. S. Hutchins, Ramapo Ajax Division, American Brake Shoe Co., Chicago.

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W. F. Kasper, Fairmont Railway Motors, Inc., Fairmont, Minn.
M. K. Ruppert, P. & M. Co., Chicago.

* President, National Railway Appliances Association, and district sales manager, Republic Steel Corporation, Chicago.

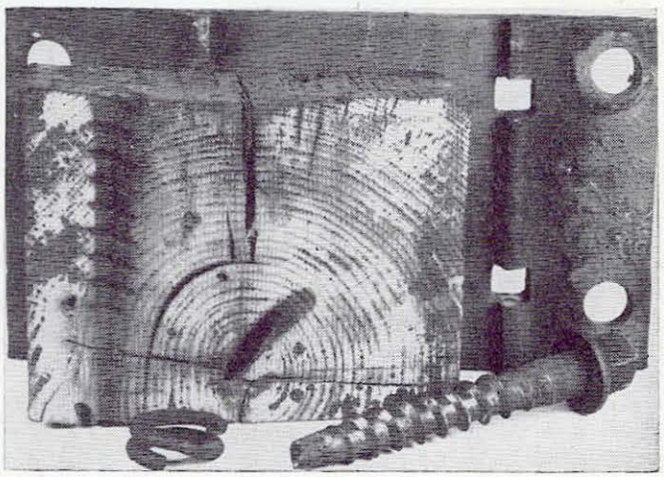
† Secretary National Railway Appliances Association, and district sales manager, Industrial Brownhoist Corporation, Chicago.

New and Improved Products *of the manufacturers*

A compilation of recent developments involving materials and appliances applicable for use in railway construction and maintenance work.* Together with related advertising pages it comprises a comprehensive exhibit in print

Spring Washer Gives Good Service

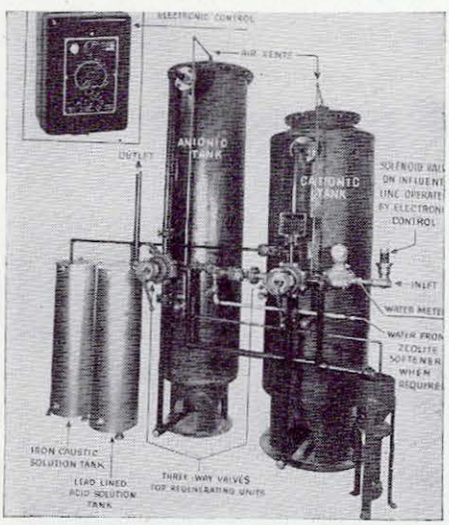
An example of service rendered by spring washers used with screw spikes for lagging tie plates is given by a specimen section of a crosstie after 10 years of service. The construction involved the use of Thackeray Hy-Crome spring washers manufactured by the Eaton Manufacturing Company, Reliance division, Massillon, Ohio. The illustration shows the specimen section, cut from a 7-in. by 9-in. by 8-ft. 6-in. treated red oak tie, together with one of the screw spikes and a washer. Aspects to be noted, as pointed out by the manufacturer, are the excellent condition of the screw spike threads in the tie, and the satisfactory recovery of the spring washer. Also, the small percentage of erosion in the top of the tie from tie plate vibration can be attributed, according to the manufacturer, to the efficient functioning of the spring washer over the 10-year period.



Specimen section of tie after 10 years' service with tie plate, screw spike and spring washer

Water De-ionizer

The Dearborn Chemical Company, Chicago, has announced the development of a method and equipment for demineralizing water, known as the Aqua-Matic De-Ionizer process of water treatment. It is claimed that the new system will produce water of a high purity, comparable to distilled water, at a saving over distillation that will pay for the de-ionizer in a short time. It is designed to demineralize water for specialized boiler feed-water requirements, such as for Diesel locomotives and for any application where water with extremely low dissolved mineral salts is essential.



Equipment for Aqua-Matic De-Ionizer process, indicating functions of parts

A typical installation consists essentially of two reaction tanks—a caustic solution tank and a lead-lined acid solution tank—and a de-aerator where required, together with the necessary electrical controls, valves and piping.

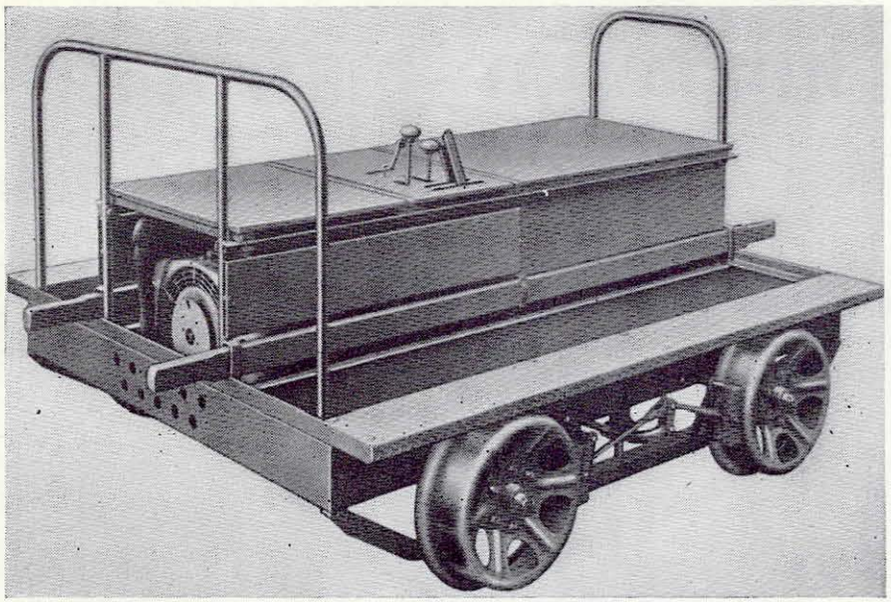
The process is one of passing the raw water through a cation exchanger, which, by means of the base exchange principle, removes the positive metallic ions, of which the more common ones are calcium, magnesium, sodium and iron, these being replaced with an equivalent amount of hydrogen. The effluent from the cation exchanger is thus composed of water and weak mineral acids. In the exchange the sulphates are converted to sulphuric acid, the chlorides to hydrochloric acid and the carbonates to carbonic acid. This latter acid, being unstable, breaks down into water and carbon dioxide removable by de-aeration.

Sulphuric acid is usually used to produce the hydrogen ions, being introduced into the cation exchanger in a five-per cent solution. The water is then passed through the anion exchanger, where the acid is absorbed by the anionic mineral that has been regenerated with sodium carbonate or sodium hydroxide and calcium-free water, the latter sometimes being obtained from a zeolite softener if necessary. This leaves the water free from all impurities, with the exception of any silica that may be present, and traces of sodium and carbon dioxide. As a rule the silica, if any, is so inert as to be harmless; only a trace of sodium remains and, as stated, the carbon dioxide may be removed by de-aeration.

Four-unit systems consisting of two cationic and two anionic units, commonly termed multi-bed systems, can be furnished and are recommended over the two-bed system where it is desired that the treated water contain less than five parts per million total dissolved solids with no appreciable amount of carbon dioxide without the necessity for aeration. The multi-bed system is also said to be particularly adaptable for waters having excessively high mineral content.

The equipment includes an electronic device which serves as a safety precaution in that it will shut off the water supply when the total dissolved solids exceed any predetermined amount.

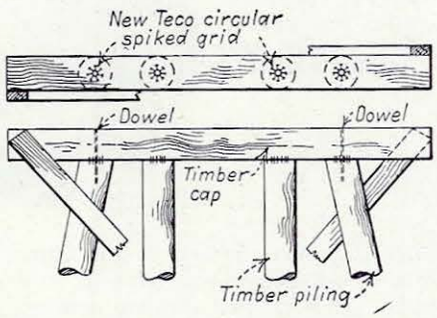
** Supplementing this compilation, the March Equipment Economics Number of Railway Engineering and Maintenance contains descriptions of many new and improved power machines that are being offered by manufacturers for use in maintaining railway tracks and structures.*



The Kalamazoo Type 56 lightweight section motor car

Section Motor Car

A new six-man lightweight section motor car, designated the Kalamazoo Type 56, has been developed by the Kalamazoo Manufacturing Company, Kalamazoo, Mich. Said to be capable of performing a wide range of work, the new car is claimed to incorporate light weight, safety, durability, high efficiency and compact design, yet with ample compartments for tools and equipment. The car is of all-steel construction, with a frame of steel channels, rigidly bolted, and with the rail skids acting as trusses. Rubber cushions are mounted in the axle housings for riding comfort. The car is powered with a 10-hp. two-cylinder, air-cooled gasoline engine having aluminum cylinders with steel sleeves. It has an all-gear transmission, with two speeds forward and two in reverse. The use of light metals in the car and engine has kept the weight (695 lb.) to a minimum. The rear lifting weight is 105 lb.



Showing how the circular spike grids are used to connect the timber cap in a pile bent with the piling

Better Multi Plate

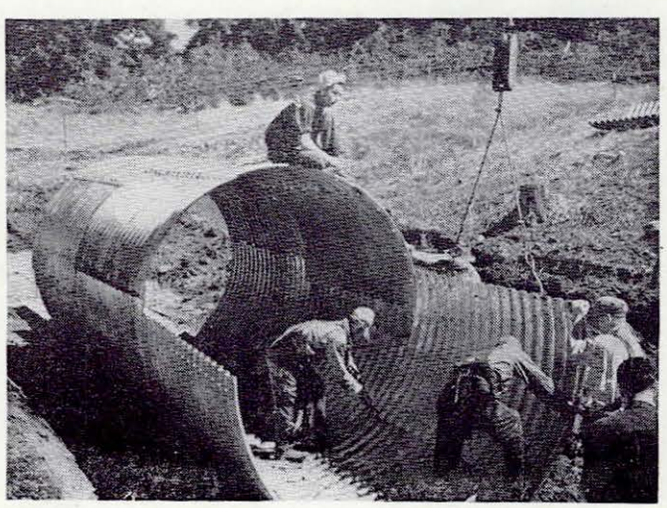
The Armco Drainage & Metal Products Co., Middletown, Ohio, has made a number of improvements in its Multi Plate drainage structures. The improved Multi Plate has 6-in. by 1¾-in. corrugations, ¼ in. deeper than formerly, and is said to have a moment of inertia, section modulus and modulus of rupture greatly in excess of the old standards. Also, larger bolts are used, the new bolts being ¾ in. in diameter instead of 11/16 in.; the continuous longitudinal seams have been changed to staggered seams; and the seams in the tops of the pipes, with a tendency to interfere with strutting, have been eliminated. The pipe is now furnished in even foot and half-foot diameters and all lengths are in multiples of two feet.

A recent survey of 834 large Multi Plate structures indicated, it is said, that they were giving satisfactory service. However, as many of these structures were installed under high fills, there was some objection to the continuous longitudinal seams as a possible source of weakness; also occasional bolt trouble was noted. The deeper corrugations and larger bolts, together with the revised seam arrangement, are said to enable the structures to carry heavier loads, or to produce economies by making it possible to use lighter plates. In addition to being available for pipe and arches, the improved Multi Plate can now be obtained for pipe arches with span-rise sizes from 77 in. by 57 in. to 15 ft. 9 in. by 9 ft. 7 in.

Teco Circular Grid

The Timber Engineering Company, Inc., Washington, D. C., has made available a new circular spiked grid for use in heavy timber joints, which is considered particularly adaptable for connecting pile caps to piling in trestle bents. The new grid, which is said to possess the properties of rigidity, positive resistance to lateral movement, and the low installation and maintenance costs which are found in the Teco flat and curved grids, is a malleable iron casting, circular in shape, and has full teeth projecting 5/8 in. both ways from the center of a ring 2 5/8 in. in diameter. All of the surfaces of the grid in contact with the timbers are beveled to provide sharp penetrating edges, the purpose being to facilitate its installation.

The new circular grid is said to have a more general application than either of the other types mentioned because its circular shape makes it adaptable for installation in more types of joints. When used for connecting pile caps to piling in trestle bents, the circular grids are installed by placing them on top of the piles and then setting the cap, as shown in the illustration. This type of construction is said to reduce the labor cost involved in drilling holes, and to produce savings in the cost of installing bolts or dowels without reducing the rigidity and effectiveness of the connection.



Improved Multi Plate pipe 96 in. in diameter being installed in connection with a railroad line-change project

Airco Electrode

A new all-purpose mild-steel electrode is being offered by the Air Reduction Sales Company, New York. Designated as Airco No. 312, the new electrode is designed to prevent underbead cracking in the welding of hardenable steels. It is claimed that laboratory tests and field applications indicate that this electrode is superior for welding a variety of steels and metals, such as low-alloy, high-tensile steels, particularly in heavy sections where preheat must be used to minimize cracking; free-machining steels which normally run quite high in sulphur content; and cold-rolled steels where excessive porosity may occur. It is also claimed that the Airco No. 312 electrode should prove highly adaptable on low-alloy or mild-steel applications where stress relieving would be desirable but cannot be accomplished, either because of lack of facilities or the magnitude of the application.

One-Spot Coal Chute

Recognizing the importance of coaling locomotives at one spotting, the Ogle Construction Company, Chicago, is offering a coal delivery chute that is said to be capable of delivering 43 tons of coal uniformly throughout a coal compartment 30 ft. long in 75 sec. It is claimed that the chute can be readily adapted to existing coaling stations and to any type of bin cut-off gate now in use. Located directly above the longitudinal center line of the coal compartment, the new chute swings in a vertical longitudinal plane through an arc of 150 deg., and because of this feature it is said to distribute the coal uniformly from end to end of the compartment without spillage over the side boards and with only one spotting of the locomotive.

Due to the fact that the chute is counterbalanced and is operated by means of a winch having a 40-to-1 gear reduction, its rotation through the operating cycle is said to require relatively little effort on the part of the operator. When not in use the chute rests in a horizontal position in the clear, and is held in place by a latch.

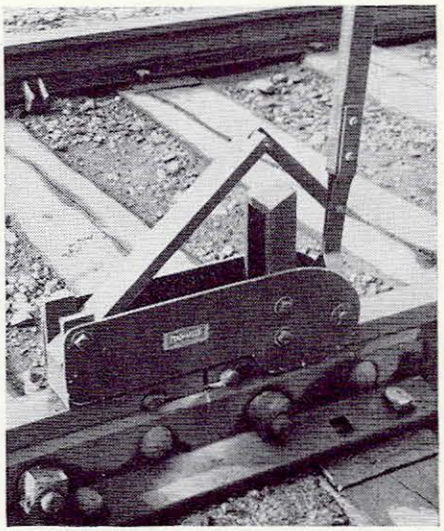
Chutes of this type that were installed in a main-line coaling station more than two years ago are said to have reduced coaling time and wear on equipment to the extent that they have more than paid for themselves. At a large engine terminal, where they have been in daily service for more than a year, it is claimed that the saving they have effected in hostling expense alone has more than offset their first cost.

One of the new coal delivery chutes in operation

Magnaflux Testing Used in Track Work

Magnaflux magnetizing equipment and powder, as produced by the Magnaflux Corporation, Chicago, already widely used by the mechanical departments of many railroads for detecting defects in mechanical parts, is now being used by maintenance of way departments for testing rails, joint bars and track tools. Inspection by the Magnaflux method is conducted by magnetizing the part to be tested by means of equipment designed for the purpose. When this is done, defects in the material cause areas of local flux leakage. Magnaflux powder is then applied to the part, the particles of which are drawn into and held by the leakage fields, creating a visible accumulation along the length of any defect.

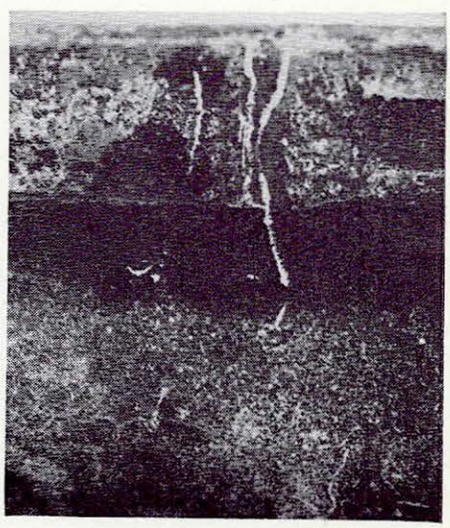
Rail joint bars sometimes develop cracks, usually in the top center of the bar between the rail ends, which are not visible to the unaided eye. To locate such cracks under service conditions, a portable device, termed the Magnaflux Track Walker, is used, as shown in one of the illustrations. This device, which contains the magnetizing equipment, is placed above the rail joint



Showing how joint bars are tested in track with the aid of the Magnaflux Track Walker. Note indications of crack in top of bar

on the head of the rail and a small amount of Magnaflux dry powder is applied to the center of the joint bar by means of a small rubber spray bulb. The unit can then be pushed along the head of the rail by the operator to the next joint. When joint bars are inspected after removal from the tracks for reforming, they can be quickly magnetized with a suitable coil and the powder sprayed on by means of a power blower.

The Track Walker has also been applied to the problem of detecting cracks in rails. It is said that six miles of rail a day can be inspected by this method. Work is now in progress on a more highly developed track-mounted unit that will make possible more rapid inspection of both rails at one time. This unit will employ electro magnets powered by a small gasoline-engine-driven generator.



Portions of a joint bar, showing three cracks as indicated by Magnaflux testing

The joints in butt-welded rail are also being inspected by the Magnaflux method, both at the time of welding and periodically after welding. High-amperage, low-voltage current is passed through the rails by means of a "C" clamp fastened to the base of the rail near the weld and another "C" clamp fastened to the head of the rail close to, but on the opposite side of, the weld. The current is then applied and the Magnaflux powder blown onto the weld area.

Increasing use is also being made of Magnaflux in the inspection of sledges, spike mauls, chisels and other track tools. New tools are inspected when received, and tools sent to the shops for reclamation are inspected before work is done on them, as well as after reforming, grinding and heat treating. Several roads are said to have reported savings through the rejection of new tools showing defects, and the scrapping of used tools with defects, making reclaiming unwarranted. Also, the inspection of reclaimed tools will show whether they are free from forging, grinding and heat-treating cracks.

Again Improves Weed Control Method

In announcing a still further improvement in the Bysolux method of weed control, the General Chemical Company, New York, says that the new development consists in incorporating a toxic oil containing a range of aromatic phenols obtained from coal-tar distillate, and also from the destructive distillation of petroleum. It is said that this range of phenols remains stable and toxic after application to the roadbed and causes a chronic and continuing effect, not only on the root and plant growth, but also on the germination of seeds, while they resist leaching and washing out of the soil.

The Bysolux method consists of the application of a mixture of Bysolux A and Bysolux C to the vegetation to be destroyed. Bysolux A, an arsenical compound has not been changed, but Bysolux C, which formerly consisted of toxic phenols from coal tars, fortified with pentachlorophenol, has been improved by the addition of the aromatic phenols. It is said that the improvement is estimated to increase the toxicity by a factor of four and to improve the physical characteristics of the oil so that it penetrates more readily into the plant tissue.

It is claimed that recent developments in war-time petroleum chemistry have resulted in the isolation of these toxic substances, which in the past have been responsible for the extended use of certain oil residues in weed killing work. However, these discoveries have made it possible to concentrate the toxic aromatics to a degree heretofore impossible. Furthermore, the recent discoveries have made it practicable, it is said, to isolate the aromatic phenols in sufficient quantities to make them available and cheap enough for fortifying the oils that were used previously.

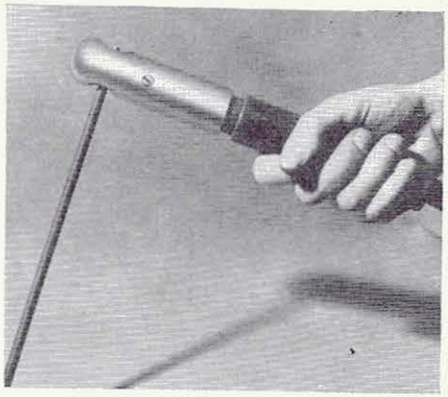
Armor-Clad Electrode Holder

A new armor-clad fully-insulated electrode holder of the screw type has been developed by the Electric Welding division of the General Electric Company, Schenectady, N. Y. A feature of the new holder is the fact that the head is completely enclosed in a sheath of aluminum armor. This armor is said to protect the insulation, to resist weld spatter, and to eliminate the possibility of accidental contact with the welding circuit. It is also claimed that the holder will remain clean while in use and that it has a relatively long life. Designed to accommodate electrodes up to and including ¼ in. in diameter, the holder weighs 15 oz. and is said to be unusually cool in operation. A slight twist of the hand tightens or releases the electrode. While in use the holder is said to grip the electrode at the correct angle and to maintain good current contact.

Protective Coating

The Dearborn Chemical Company, Chicago, has introduced a new protective coating which is being marketed under the name NO-OX-ID Bond Kote. This material supplements the regular Dearborn line of NO-OX-ID coatings, but is distinctive in that it is a synthetic resin material which, when dry, is said to form a tough film highly resistant to abrasion. It is also claimed to resist cracking at low temperatures. Bond Kote is said to have given excellent results in laboratory tests under all kinds of weathering conditions, including exposure to high temperatures, high humidity and salt spray, as well as showing resistance to petroleum oils, solvents and other oil derivatives. It is manufactured in both red and black.

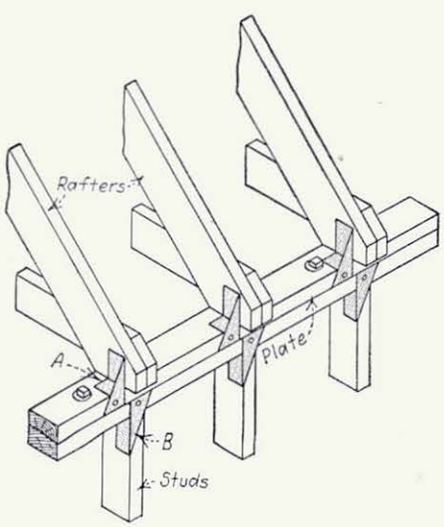
This product may be used as a finish coat by brush or spray application on clean metal surfaces and as an underfilm protective primer prior to ordinary painting. Bond Kote is said to dry dust-free under good drying conditions in from 20 to 30 min., and to dry completely in 24 hrs. It is recommended for both inside and outside protection of tanks for storing oil, dilute acid and alkaline solutions, for use on structural steel subjected to indoor and outdoor exposure, and on piping, including high-temperature lines.



The new armor-clad fully-insulated electrode holder

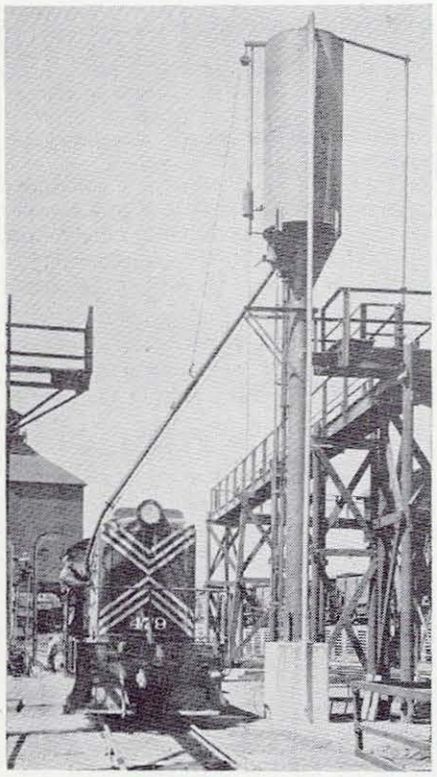
Teco Trip-L-Grip

The Timber Engineering Company, Inc., Washington, D. C., has introduced a new framing anchor for making secondary connections in heavy timber structures and for completely knitting together light timber structures. Known as Teco Trip-L-Grip framing anchors, these devices are so designed that all nails act in shear, which is said to be recognized as the best practice in nailed connections. The anchors are made in three different types, designated as A, B and C, which are said to be applicable for use in a wide variety of joints, involving, for instance, the fastening of joists to beams, beams to posts, rafters to plates and plates to studs. Among the advantages claimed



Showing how the anchors are used to connect rafters to plates and plates to studs

for these framing devices are improved strength characteristics, low installation costs, simplicity of application, the elimination of toenailing and increased rigidity.



The sanding plant at Joliet, showing one of the spouts in operation

Sand Spout Has Roller Bearings

The development of a telescopic, balanced sand spout for sanding Diesel locomotives, which incorporates roller bearings as a means of helping to achieve the range of action required for such locomotives, has been announced by the Ross and White Company, Chicago. The spout, which has an enclosed moisture-proof cut-off, was designed for filling the various sand boxes on the sides, tops and ends of the Diesel switching locomotives in service on the Elgin, Joliet & Eastern, at Joliet, Ill. The spout delivers the sand from 10-ton sand storage towers and serves two tracks.

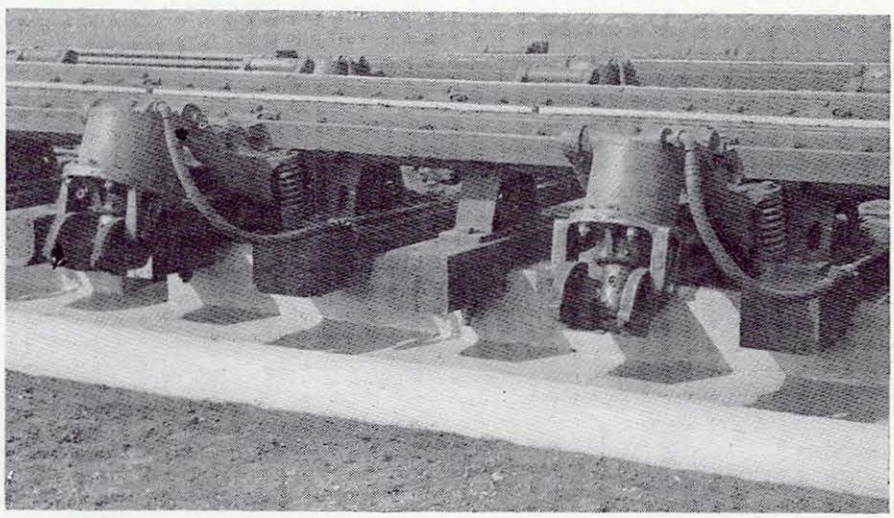
In order to secure a straight flow of sand from the bin to the outside boxes of the locomotives it was necessary to secure an inclination of 45 deg., which is accomplished by the use of the telescopic spout. The lower section of the spout is balanced by a 75-lb. counterweight on the side of the sand bin column so that it can be readily extended and withdrawn; a heavy overhead counterweight holds the entire fixture in the clear when not in use. The under-cut cut-off valve is opened and closed from the end of the spout at the sand box of the locomotive and is kept taut and straight by a ball weight operated in an eye-bolt on the sand valve lever. To overcome the retarding action caused by sand dust in the sliding pipes, the spout is equipped with roller bearings, one at the top of the spout and one at the bottom.

Concrete Supports for Car Retarders

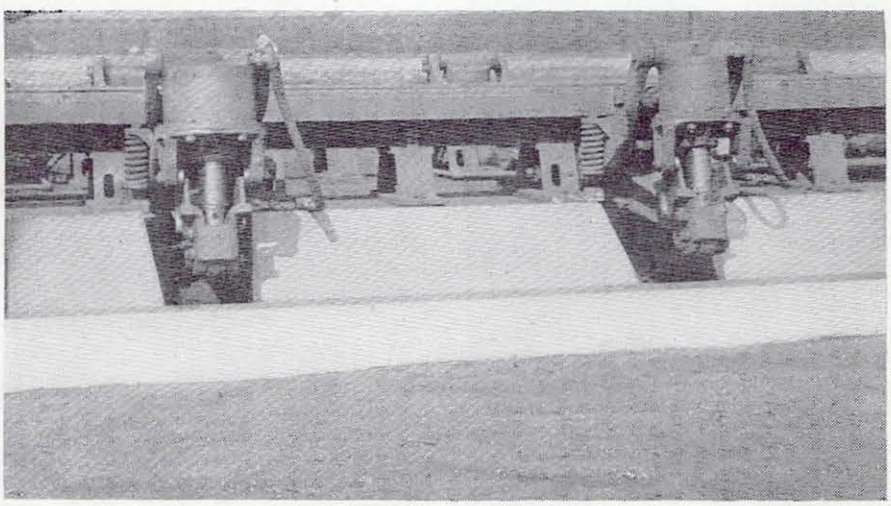
What are reported to be the first concrete supports for car-retarders have been installed at the classification yard of the Pennsylvania at Enola, Pa. Previous practice had been to install retarders on track laid on ties and stone ballast, but such construction requires frequent lining and surfacing of the track to keep the retarders in satisfactory working order, and as a solution to this problem it was decided to adopt a design that would afford a more stable foundation. The concrete supports are constructed in the form of slabs with upturned curbs and are 13 ft. wide and approximately 25 ft. long between expansion joints, with a minimum thickness of 12 in. at the bases of the curbs and a maximum center-line thickness of 17 in. The over-all lengths of the retarder base slabs vary from 71 ft. 9 in. to 115 ft. 6 in.

A total of 10 car-retarder units are supported on the concrete slabs. At nine of these units the rails are supported on steel chairs that are bolted to 8-in. by 10-in. oak ties, 9 ft. long, while in the other unit the chairs are bolted directly to concrete bolsters. Where ties are used, they are notched one inch to prevent transverse movement, and, in turn, rest in slots in two concrete bolsters, 17 in. wide and 11 ft. 8 in. long. Each pair of bolsters supports five ties on 2-ft. 1-in. centers. A 10-in. space is left between the ends of adjacent bolsters for drainage.

On the unit where ties are not used, the concrete bolsters are 4 ft. 10 in. long, and the retarder chairs are fastened to



Nine of the retarder units have rail chairs bolted to oak ties



In one retarder unit the rails are supported on chairs bolted to concrete bolsters

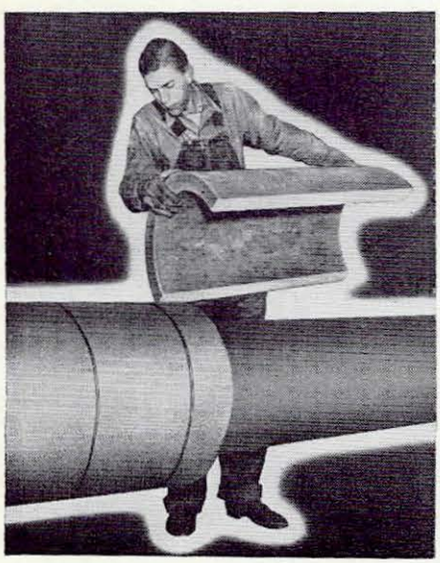
them with 1¼-in. bolts, 15 in. long. Fabreeka cushioning pads, ¼ in. thick, are used between the chairs and the concrete. Ten-inch drainage spaces between bolster ends are provided.

The slabs are so designed that surface water is conveyed to catch basins located at the ends of the slabs. To prevent water from getting under the slabs through the expansion joints, the joints are sealed with metal waterstops. Bulkheads are provided at both ends of the slabs to keep out ballast. In addition, the ends of the slabs are provided with footings 3 ft. wide and 9 in. deep, which serve to strengthen the end sections and to anchor the slabs against longitudinal movement. To provide easy transition from standard track construction to the rigid retarder slabs, a reinforced concrete approach slab, 10 ft. 8 in. long by 9 ft. wide, is provided at each end of each retarder support. The approach slabs are placed on inclines so that the thickness of the ballast below the ties increases from 6 in. at the retarder to 18 in. at the opposite end of the approach.

The 10 retarders have been in service since November, 1944, and it is reported that the design has thus far proved satisfactory in every respect.

Pipe Insulation

The Union Asbestos & Rubber Co., Cicero, Ill., is introducing its sectional pipe insulation into the railroad field. Containing Amosite asbestos fiber, this product, known as Unibestos, is applicable for insulating steam lines in and around power plants, office buildings, terminals, enginehouses, or wherever it is desired to reduce heat losses from pipe lines. It is said to be clean and easy to apply, and that it can be mitered to fit bends and elbows. The fibrous nature of this insulation is said to make for an effective thermal seal, requiring only a surface application to finish it neatly and completely. It is claimed further that it will not dent, shatter, sag or gap, that it is not affected by moisture and that it can be removed and reapplied without impairing its insulating efficiency. It is available in half sections up to 30 in. (pipe diameter) and in quarter sections for pipe from 32 in. up to 60 in. in diameter. The thickness is ¾ in. to 5 in. Single layer construction is designed for temperatures up to 1200 deg. F.



Illustrating the application of Unibestos

Portable Fountain

A new portable drinking fountain fitted with a salt dispenser, to provide fresh water for gangs working outside shops and in the field where they do not have access to fixed drinking fountains.

The Dobbins portable drinking fountain

is being offered by the Dobbins Manufacturing Company, Elkhart, Ind. The portable equipment consists of a tank with a capacity of four gallons; a built-in, corrosion-proof bubbler of the tilting type, which is concealed inside the fountain to prevent freezing; a water-release knob which, it is said, requires only slight pressure to provide the desired flow of water; and a pump equipped with a valve plunger, which provides air for the necessary water pressure. All fountains are equipped with loops for carrying straps and are fitted with mounting brackets for salt-tablet dispensers, each of which will hold 500 tablets.

Among the advantages claimed for this equipment is that it does away with the common drinking cup that is used so widely by section and extra gangs, as well as other field forces; that the water is sealed from contamination with dust and dirt, so that the men get it under sanitary conditions; and that the provision for the salt tablets will reduce the incidence of heat prostration.

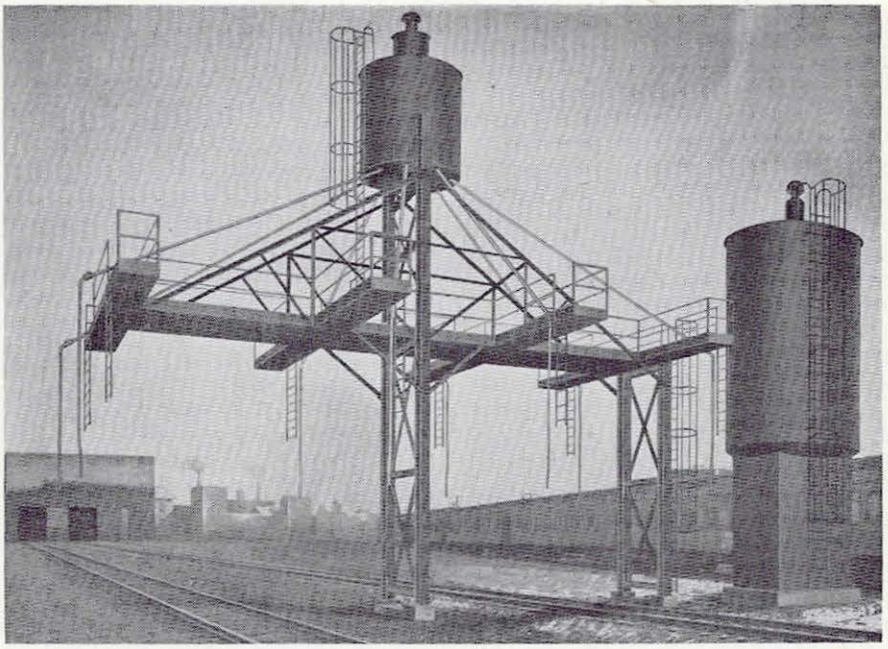
Heat-Treated Rail Crossing

An improved heat-treated rail crossing has been introduced by the Weir Kilby Corporation, Cincinnati, Ohio, and Birmingham, Ala., which is recommended for use where density of traffic and speed require a crossing of durable and economical construction. The method used for constructing the crossing consists of fabricating and completely assembling all of the parts in carbon steel rail. After all adjustments have been made to insure the correct fit of all of the component parts, the crossing is taken apart and sent to the heat-treating plant, where each section of rail is individually treated and tested before the final assembly of the crossing. The rails are treated in their entirety—rail, head and base—after all bending and machining have been done, thus eliminating the necessity for disturbing any portion of the rail after heat-treatment to permit adjustments necessary in assembly. The heat treating is performed by a large, well-equipped heat-treating company, which has collaborated with the Weir Kilby Corporation in research to determine the best practice to be followed in the heat-treating process.

Electrode for Heavy Weldments

A new heavily-coated arc-welding electrode for flat and horizontal welding, as well as for flat butt welding, has been developed by the Electric Welding division of the General Electric Company, Schenectady, N. Y. The applications of the electrode, known as Type W-27, are said to include structural parts, such as column plates, columns, roof trusses, beams and girders where the thickness of the section permits, as well as pressure vessels and heavy machine bases. It is said to have an exceptionally high melting rate, resulting in increased production and higher speeds. It is claimed that it requires less heat input to the joint, thus reducing warpage and internal cooling stresses, and that it will operate through a wide range of current. The new electrode operates on either alternating current or on direct current with either straight or reverse polarity. It is available in three sizes: 3/16 in. by

Welding a steel machine base with the Type W-27 electrode



The new sand plant is designed to speed the servicing of Diesel-electric locomotives

18 in., ¼ in. by 18 in. and 5/16 in. by 18 in., and is rated American Welding Society Classes E6020 and E6030.

Diesel Sand Plant

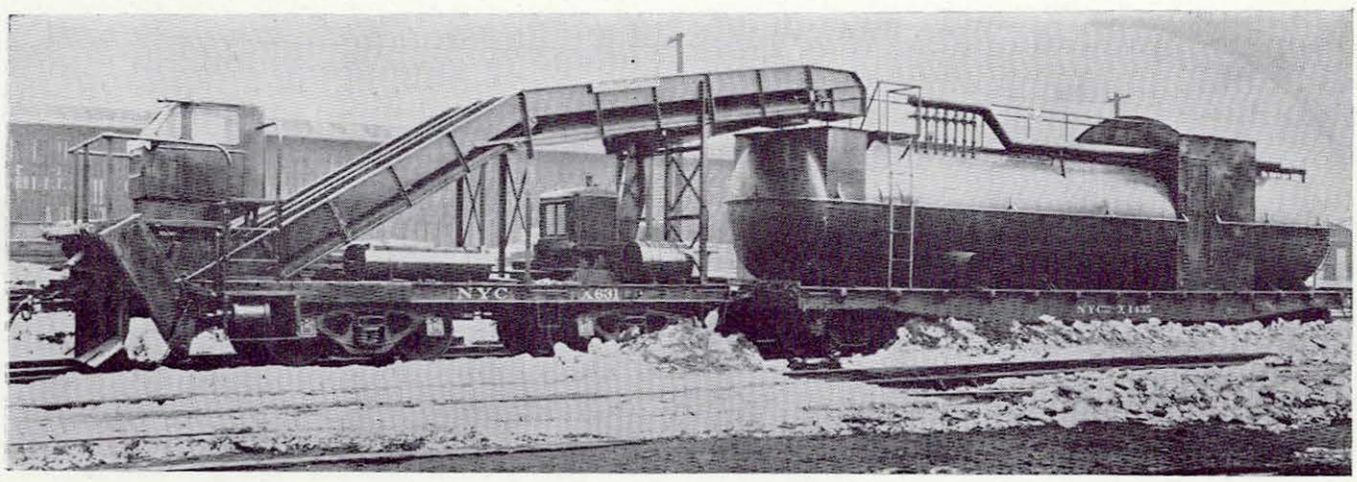
The T. W. Snow Construction Company, Chicago, has developed a design for a complete two-track sand storage and handling plant for sanding Diesel locomotives, which incorporates a number of unusual features. Outstanding among these features is the fact that the plant incorporates a single elevated 10-ton service tank with individual sand delivery pipes extending to all outlets, of which there are eight. It is also worthy of mention that the elevated service tank and the sand delivery pipes and hoses are mounted on an overhead structural steel frame, incorporating a system of walkways giving access to the sand valves in the outlets and including a suspended ladder at each outlet, by means of which access may be obtained from the tops of the locomotives to the valves and the walkways.

Forming a part of the new sand plant is an adjacent 60-ton cylindrical tank for storing dry sand. Underneath the storage tank, and serving as the foundation for it, is a sand house containing a hopper to which the pre-dried sand is delivered from box cars. From the hopper the sand passes into a closed drum, from which it is elevated to the 60-ton storage tank by compressed air. From the storage tank the sand flows by gravity to the closed sand drum, from which it is raised to the 10-ton service tank for delivery directly to the sand boxes of the locomotives.

The eight hose lines at the outlet ends of the sand delivery pipes are so located, two on each side of each track, that sand can be delivered simultaneously to the four sand boxes in one unit of each of two locomotives. Thus the locomotives can be sanded with one spotting for each unit, at the same time that they are being fueled and other servicing operations are being performed. Specially-designed, weatherproof, totally-enclosed Snoco sand valves are provided to control the delivery of sand to the sand boxes.

Snow Melter

The Barber-Greene Company, Aurora, Ill., has introduced a new snow-melting machine, known as the Barber-Greene snow melter, which consists of two separate car units, the Model 568 snow loader and a melting tank. The units are each built integrally with a 70-ton flat car and are operated in conjunction with a locomotive.



The Barber-Greene snow loader and melter

The method of operation consists of coupling the loader and tank units ahead of a heavy freight locomotive, which furnishes the motive power and the steam used to melt the snow. The snow is removed from the track by the loading unit and is carried upward by two continuous belt conveyors to a hopper at the top of the melting unit which incorporates two tanks. Water is heated in the smaller or heating tank, then flooded through large gate valves into the larger tank to an initial depth of about two feet, the gate valves remaining open. The snow is discharged into the hot water, directly in front of a bank of steam injection nozzles which agitate and circulate the dissolving snow and heat the water as it accumulates. When both tanks are filled with water from the melted snow, the loading process is halted, the gate valves are closed and steam is turned on in the heating tank. The melting tank is then emptied into a convenient drain or catch basin and the process repeated.

The idea for the snow-melting unit of this machine was originally developed on the Boston & Maine. On this road, as described in the *Railway Age* of December 30, 1944, the snow-melting unit was used in conjunction with a snow loader consisting of a rubber-tired street loader converted to a track-mounted loader by applying flanged wheels. The loader picked up the snow and delivered it to a discarded locomotive tender tank that served as the melting unit. In the Barber-Greene machine the basic idea behind the B. & M. melter has been enlarged upon and refined.

It was decided to design the loader with two elevating conveyors. An air-operated scraper blade can be lowered to operate at rail level or below, depending on yard conditions. Above the scraper, a feeding spiral aids the flow of snow into the conveyors and breaks up any bridging tendencies. The basic scraper width is 9 ft., which can be increased to suit individual yard conditions by adding side gathering wings. For transport to destination, the loader meets clearance requirements of 5½ in. above the rails.

To operate a melting unit of this size at a high rate of speed requires steam from a locomotive of about 5,000 boiler horsepower capacity, similar to a New York Central L-3 freight locomotive. Steam from the turret is piped forward to the tank unit header pipe. The melting unit operator has control of the steam and, in practice, regulates the amount of heat added so that the water, when ready to dump, is only slightly above freezing temperature.

Diesel Engines

The Witte Engine Works, Kansas City, Mo., is introducing to the railway field, through its newly-appointed national railway representative, the T-Z Railway Equipment Company, Chicago, its line of Diesel engines and Diesel-electric plants. The 4- and 9-hp. vertical, and the 6- and 12-hp. horizontal, Diesel engine units are of the four-cycle, single-cylinder design. The 4- and 9-hp. vertical models can be equipped with electric starting systems. A push-button control connected with the 12-volt starting battery can be located at a remote distance from the installation.

The water-cooled cast-iron cylinder heads of the engines are fitted with hardened valve seat inserts and replaceable valve stem guides. The head of each engine contains a precombustion chamber into which the fuel oil is forced by the pump and injector nozzle. This assembly consists of a plunger-type fuel-injection pump, nozzle holder and pintle-type nozzle, with the nozzle being automatically operated by fuel pressure.

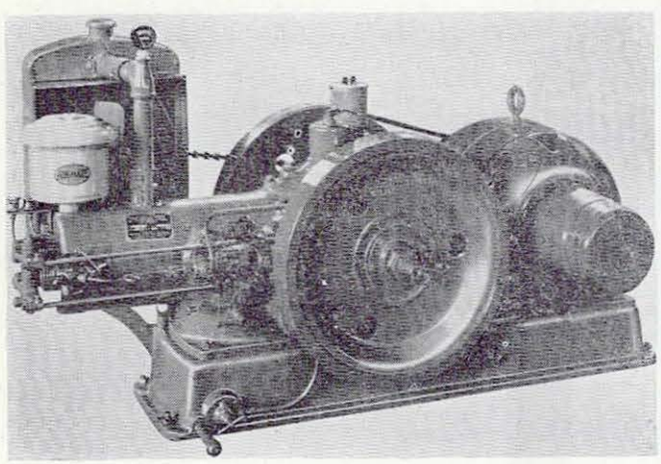
The alloy cast iron cylinder blocks are fitted with removable, heat-treated, chrome-cylinder liners of the wet type, in which operate pistons that are fitted with four regular rings and one oil regulating ring. The crankshafts are made from heat-treated steel drop forgings, fitted with tapered roller bearings. The connecting rods are made of the same material and are fitted on both ends with renewable, bronze-backed, babbitt-lined bearings. All the engines may be equipped with a plain pulley or a twin-disc clutch, with or without pulley, or a twin-disc clutch and reduction gears.

The Diesel-electric plants cover a range of from 3 kv.a. to 10 kv.a. They may be direct or belt-connected to the generators, and may be cooled through a radiator, tank or marine pump. For use as an auxiliary, the engine may also drive a pump, compressor or hoist, because belt power may be taken from the engine when the full capacity of the generator is not required.

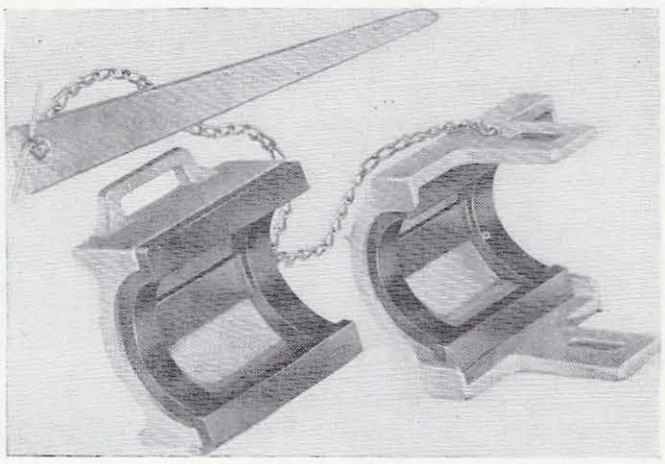
It is claimed that the Witte Diesel consumes only ½ pint of fuel per horsepower-hour. Thus, it is said, a 4-hp. Diesel can run at full load for 8 hr. on two gallons of Diesel fuel.

Pipe Coupling

Drinkwater, Inc., Chicago, is now introducing into the railroad field its Presto-Lock coupling, a type of pipe coupling for plain-end pipe that can be applied without the use of wrenches or special tools of any kind. The coupling consists of three or four parts—two castings comprising the top and bottom halves of the coupling, and one or two wedge keys. The two halves of the coupling are fitted over the ends of the pipe and the wedge key is inserted in channels provided for it and driven to place with a hammer. Gaskets are used on each end of the pipe to obtain a tight joint, these being available in three types, made of synthetic rubber, neoprene or natural rubber. The synthetic rubber gaskets are recommended for general use, except where petroleum products are carried by the pipe lines. Neoprene gaskets should be used where petroleum derivatives are handled, while



One of the Witte Diesel-electric plants



Dis-assembled view of a Presto-Lock coupling

natural rubber gaskets are supplied for special applications.

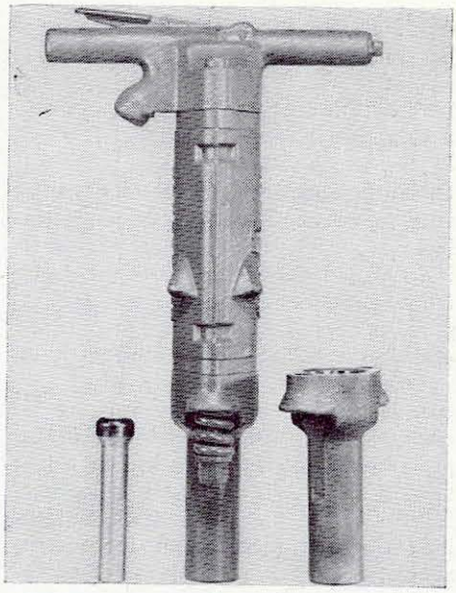
The couplings are made in 11 standard pipe sizes from 1¼ in. up to 16 in. Sizes up to 3 in. are supplied with one wedge key, with chain assembly to prevent loss of the coupling parts, and the larger sizes are made with two keys without chains. Among the features claimed for the Presto-Lock coupling are ease and speed of application and removal, and a high degree of flexibility, permitting pipes to be joined at angles up to 40 deg. They can also be used for repairing leaks.

Inertol Coatings

A number of improvements have been made in the line of protective coatings manufactured by the Inertol Company, Inc., Newark, N. J. Among the improved products is Inertol Standard Thick, in which changes have been made that are claimed to have eliminated the tendency toward alligatoring caused by the action of the sun or heat in general. Also, this company's Ramuc Enamel, which is used in shower rooms and lavatories, is said to be greatly improved over the war-time grades in that it is now manufactured with a rubber base. It is said that the durability and color fastness have been greatly increased by the availability of synthetic rubber.

Spike Driver

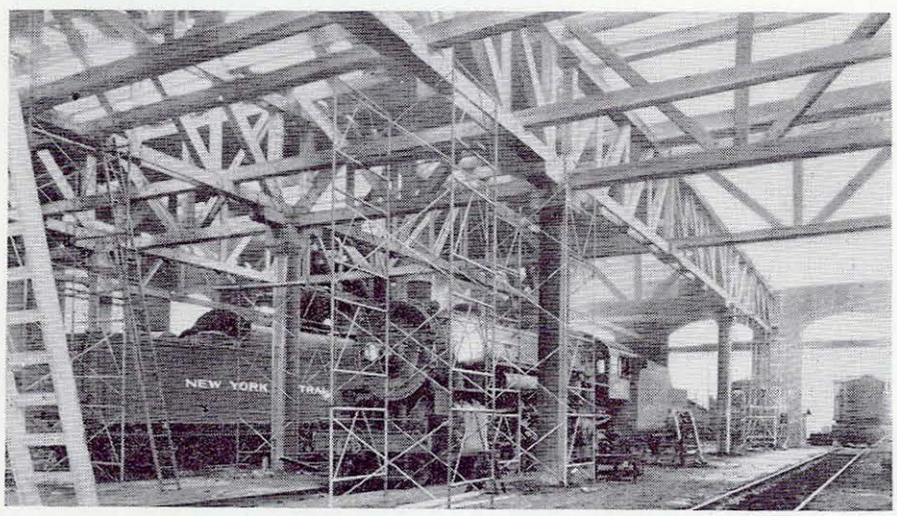
The Cleveland Pneumatic Tool Company, Railway division, New York, has developed attachments for converting its standard C7 pneumatic paving breaker into a spike driver. The attachments required for this purpose consist, as shown in the illustration, of a front head or chuck end and a tappet driver. To make the change, the tappet driver is inserted in the chuck head which is substituted for the paving breaker head. When the machine is assembled, a recess is provided in the lower end of the chuck head of sufficient depth to accommodate the head of the spike and to permit the latter to be driven without the possbility of the chuck head jumping off the spike. The practice is to start the spikes by hand before driving them with the machine. The spike driver is usually operated by one man.



The C7 paving breaker, with the attachments for converting it into a spike driver

Rubber-Asphalt Sealing Compound

The introduction of Careylastic, a hot poured rubber-asphalt compound for sealing joints in concrete paving and other construction work, has been announced by the Philip Carey Manufacturing Company, Cincinnati, Ohio. The product contains rubber, asphalt and other materials, and the principal advantage claimed for it is the excellent bond obtained. It is said that an infiltration-proof seal is provided which affords protection in excess of all known specification requirements throughout the entire range of annual temperatures, and that it will retain its resiliency and cohesion, while permitting the normal compression and recovery of the non-extruding fibre joint filler, throughout the seasonal cycle of expansion and contraction. It is also claimed that, because of the elasticity of Careylastic, the seasonal variations in joint dimensions do not result in extrusion of the seal, and that its bond to adjacent construction will not break at low temperatures. The method of heating and installing Careylastic is said to be the same as that followed in the application of ordinary filler asphalt.



Locomotive shed built with Protexol-treated material

Pyresote Improved

The Protexol Corporation, Kenilworth, N. J., is now offering an improved version of its product, Protexol Pyresote (Class D). This is a salt compound for timber treatment, which is said to render wood highly resistive to fire, decay and insects in a one-movement process. The recent improvements in the treatment are said to increase its permanence and practically to eliminate any corrosive effect on hardware.

Backfill Tamper

A new backfill tamper, designated as Model T23, has been developed by the Gardner-Denver Company, Quincy, Ill., which is designed for tamping the backfill in trenches and other excavations, and for use in compacting the earth under walks, roadways and foundations.

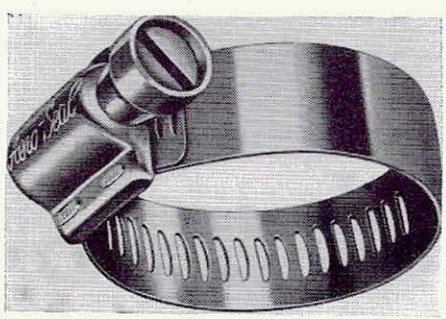
The T23 backfill tamper in operation

Operated by compressed air, the tamper has an overall length of 47¾ in., a weight of 34 lb., and a butt or tamping head with a diameter of 5¾ in. It has a ½ in. air inlet and a cylinder bore of 1½ in. which is burnished by a special finishing process to increase its resistance to wear. The lubrication system includes an integral oil reservoir which is arranged to feed only when the tamper is in operation. Another feature is that the front head of the cylinder compresses the piston rod packing as it is screwed on the cylinder and, when the correct compression of the packing is obtained, the cylinder head is held in place by a pin which is locked by a retaining ring. A double-taper locking feature of the tamping butt is said to hold the butt securely on the piston against all shock and vibration, while at the same time permitting its removal when necessary.

Hose Clamps

Originally designed for use on Army and Navy aircraft, Aero-Seal hose clamps manufactured by the Aircraft Standard Parts Company, Rockford, Ill., have now been made available to the railroads as well as to industry generally. A feature of these clamps is that they employ the worm-drive principle in the tightening mechanism. A 10-pitch hardened steel worm engages perforations in the band, thus producing a tangential pull to give a belt-like tightening action and uniform clamping pressure around the hose. An advantage claimed for this construction is that it permits the band to pass through the worm housing, thus, it is said, providing long take-up and permitting the clamp to be adjusted to variations in hose diameter, wall thickness, and the flow of rubber under repeated tightening of the hose in service.

The clamp may be installed over the hose in place by backing the band out of the housing so that it can be sprung open and snapped over the hose. The clamp is available with either a thumb grip or a screwdriver slot on the end of the worm. The screwdriver type of worm has a cup surrounding the slotted head so that the screwdriver can be engaged easily in darkness or in difficult locations without slipping off the head. The clamp can be furnished in either cadmium plated spring steel or in stainless steel. It is recommended for use on water, steam, air, oil and other hose lines where pressures are within the range of the clamp. It is made in 17 sizes to fit hose with outside diameters ranging from ¾ in. to 4½ in.



Aero-Seal worm-drive hose clamp

Portable Rock and Gravel Plant

A post-war development in portable rock and gravel plants has been announced by the Pioneer Engineering Works, Minneapolis, Minn. This is a two-unit portable plant including a primary unit and a secondary unit. The plant is said to be of high capacity and light enough in weight to pass state highway limits.

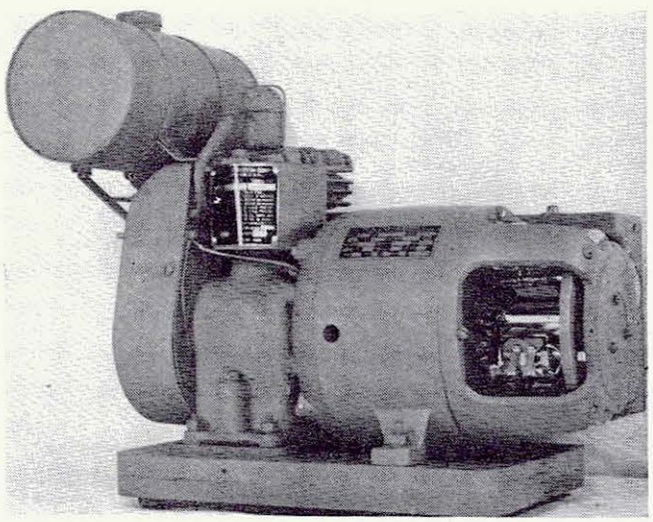
The primary unit is different for rock or for gravel but the secondary unit is the same for either. The primary unit for handling gravel includes a feeder conveyor, a scalping screen, a primary jaw crusher and a power plant. For handling rock the unit includes an apron feeder, a primary jaw crusher and the power plant. In either case the unit is mounted on a three-axle truck.

The secondary unit includes, for either rock or gravel, a feeder conveyor, a 4 ft. by 10 ft. vibrating screen, a 40 in. by 22 in. roll crusher, a return conveyor and a power plant, all mounted on a three-axle truck.

Three optional sizes are available in the primary jaw crusher, namely, 10 in. by 36 in., 15 in. by 36 in., and 20 in. by 36 in. The plants can be readily changed from rock to gravel service or vice versa. Further flexibility is said to be provided in the gravel primary unit in that a swivel conveyor can be added and the mechanical feeder and hopper moved to the receiving end of the swivel conveyor.

Charging Generator

A new battery-charging generator set, known as Model 23PZBS, has been developed by the Kato Engineering Company, Mankato, Minn. Having a capacity of 500-watts at 6-volts, the set is powered by a Briggs and Stratton single-cylinder air-cooled gasoline engine. The engine has a 2 in. bore and 2 in. stroke, float-feed carburetor and a gravity-feed sensitive flyball governor which permits adjusting the charging rate. The engine is provided with magneto ignition, and is self-starting, but can be started by hand if necessary. The generator is bolted to the side of the engine crankcase; the driving end of the armature shaft is piloted on to the end of the engine crankshaft; and the outer end of the armature shaft is carried by a grease-sealed ball bearing. The net weight is 125 lb.



The Model 23PZBS battery charger

This unit will charge a maximum of about 80 amp. at 6 volts. The length of the commutator is sufficient to permit of using extra large dual brushes. There are four sets of brushes with two all-brass brush holders on each stud. Extra heavy conductors and large terminals are provided to permit handling the large volume of current with a low voltage drop. Each unit is provided with a starting switch, ammeter and reverse-current relay. The commutator and brushes are said to be easily accessible by removing the spun metal housing. The charger is also available for 12 volts and 32 volts.

GENERAL NEWS

January Net Income Was $31,000,000

Net railway operating income for that month was $70,848,185

Class I railroads in January had an estimated net income, after interest and rentals, of $31,000,000, compared with $39,048,188 in January, 1945, according to the Bureau of Railway Economics of the Association of American Railroads. The month's net railway operating income, before interest and rentals, was $70,848,185, compared with the January, 1945, figure of $76,041,453.

For the 12 months ended January 31, the rate of return on property investment averaged 3.04 per cent, compared with a rate of return of 3.97 per cent for the 12 months ended January 31, 1945.

Total operating revenues in January amounted to $640,871,880, compared with $750,911,171 in the same month of 1945, a decrease of 14.7 per cent. Operating expenses amounted to $490,059,355, compared with $530,045,245, a decrease of 7.5 per cent.

Class I roads in the Eastern district in January had an estimated net income of $10,000,000, compared with $8,324,598 in the same month of 1945. Their net railway operating income was $24,134,612, compared with $26,405,418 for 1945.

Gross in the Eastern district in January totaled $280,962,740, a decrease of 10.4 per cent, compared with the same period of 1945, while operating expenses amounted to $226,317,688, a 7.7 per cent decrease.

Class I roads in the Southern region in January had an estimated net income of $6,000,000, compared with $9,573,072 in the same period of 1945. Their net railway income was $11,046,640, compared with $13,924,312.

Operating revenues in the Southern region in January totaled $89,876,835, a 20.7 per cent decrease as compared to the same period of 1945, while operating expenses amounted to $67,829,945, a decrease of 6.1 per cent.

In the Western district, the Class I roads had an estimated net income in January of $15,000,000, compared with January, 1945's $21,150,518. Their net railway operating income was $35,666,933, compared with $35,711,723 for the corresponding 1945 period.

The January gross totaled $270,032,305, a decrease of 16.6 per cent compared with the same period of 1945, while operating expenses totaled $195,911,722, a decrease of 7.9 per cent.

Col. Johnson, Pelley Recipients of Medal for Merit

The Medal for Merit, "symbolic of extraordinary fidelity and exceptionally meritorious conduct," was awarded Col. J. Monroe Johnson, director of the Office of Defense Transportation, and John J. Pelley, president of the Association of American Railroads, by President Truman in ceremonies at the White House March 8.

Col. Johnson's presentation was accompanied by the following citation:

"John Monroe Johnson, for exceptionally meritorious conduct in the performance of outstanding services to the United States as director of the Office of Defense Transportation. His broad experience and understanding of transportation problems were of inestimable value to both the armed forces of the nation and its transportation agencies, when transportation was more vital to the war effort than in any previous war. The soundness of his concept of the problem and his policies were of immeasurable assistance to the nation in satisfactorily handling the movements of personnel and materials, in numbers and volume without parallel in history. His ability, his industry and his untiring devotion to duty were of incalculable benefit to the war effort of the nation."

Mr. Pelley's citation read:

"John J. Pelley, for exceptionally meritorious conduct in the performance of outstanding services to the United States as President of the Association of American Railroads. Under Mr. Pelley's inspiring and aggressive leadership, the Association of American Railroads throughout the entire emergency period served to unite the efforts of the military establishment and the nation's principal railroads in the expeditious and efficient movement of unprecedented freight and passenger traffic. Mr. Pelley has been an unfailing source of wise counsel and advice to the military establishment on all phases of railroad transportation. In the truest sense, he personifies the close cooperation, the untiring energy, and the efficient methods which enabled the nation's railroads to achieve their outstanding and widely acclaimed success in meeting the domestic transportation requirements of the greatest war in history."

CLASS I RAILROADS—UNITED STATES

Month of January

	1946	1945
Total operating revenues	$640,871,880	$750,911,171
Total operating expenses	490,059,355	530,045,245
Operating ratio—per cent	76.47	70.59
Taxes	69,217,642	130,462,486
Net Railway operating income (before charges)	70,848,185	76,041,453
Net income, after charges (estimated)	31,000,000	39,048,188

Subsidized Rivalry Protested by Pelley

Sees "public service" of any transport agency tied to over-all costs

Declaring that the service rendered by railroads is public service, even though American experience has shown that it can be rendered best under privat operation, John J. Pelley, president of the Association of American Railroads, reminded the Omaho, Neb., Chamber of Commerce, in an address delivered before that body on March 14, that in spite of rendering that service, railroads are expected to "and do" bear all their own costs in addition to paying real taxes.

"Under present-day policies," Mr. Pelley said, "railroads are in direct competition with other commercial transportation enterprises which are not subject to the same exacting requirements."

"In normal times," he added, "one result is that an increasing share of the total traffic of the nation has been diverted from the railroad to these other forms of transportation. Where that is due to superior service and lower real costs, there can be no objection, but where the diversion is due to the fact that a major part of the cost of the competing service is borne by the taxpayers who provide the waterways, airways and highways, rather than by those who use them commercially, there is valid ground for objection."

Increases Transport Costs—Mr. Pelley said that the most obvious objection to subsidized transportation is the addition to the cost of government, which is "heavy enough," but he declared that an even more important objection is the increase in the total cost of carrying on the necessary transportation of the nation.

"Railroads ask no more than equal treatment and opportunity," he said, "and they should have no less. Under such conditions traffic would go where it could be handled best, on the basis of service, efficiency and true cost. On that basis, the future of the railroads would be determined by the future of the nation which they have helped to build and serve in peace and war."

Mr. Pelley pointed out that although some shippers and travelers may pay less in some instances, the cost of transportation as a whole is increased by the encouragement of uneconomic investment of public funds in transportation facilities and the artificial reduction in the volume of rail traffic, with consequent increase in the unit cost of handling that which remains.

(*Continued on page 582*)

German Equipment Exhibited by Army

Locomotives, cars and Diesel engines displayed by the Transportation Corps

Rail equipment consisting of five steam locomotives, one Diesel and several cars of special types captured in Germany was exhibited at Fort Monroe, Va., by the Transportation Corps Board on March 6, 7 and 8 for representatives of science and industry. A special showing was held on March 5 for Congressmen and representatives of the press.

The rail exhibit included an individual-axle-drive streamlined locomotive; a condensing locomotive; two standard freight locomotives; a narrow-gauge switching locomotive and a Diesel switching locomotive with a hydraulic transmission. With the exception of the narrow-gauge and the Diesel types all of the locomotives were built by Henschel & Son, Kassel, Germany. Five freight cars were displayed: a standard box car; a 16,645-gallon all-welded tank car; a high-side gondola; a flat car of 80 metric tons capacity and a box car carrying interlocking and signal equipment for the emergency replacement of a damaged wayside control tower.

Individual-Axle-Drive Loco. — The individual-axle-drive locomotive was built in 1941 and operated in passenger service between Hamburg and Berlin until May, 1945. It is a 2-8-2 type locomotive with a maximum tractive force of 36,000 lbs. Each driving axle is powered by a two-cylinder V-type steam engine, two being mounted on the left side at Nos. 1 and 3 driving axles and two on the right side at Nos. 2 and 4 axles. The locomotive is equipped with roller bearings throughout and with force-feed lubrication to the cylinders and valves and to points such as driving-box shoes and equalizer pins. All driving wheels have clasp brakes with two-piece brake shoes. This locomotive was illustrated on page 862 in the November 24, 1945, issue of the *Railway Age*.

The condensing locomotive is of the 2-10-0 type built in 1944 for service in bad-water districts or where water is scarce. Tests by the Military Railway Service showed that it could run approximately 700 miles without replenishment of its water supply. A detailed description of this locomotive was included in the *Railway Age* of December 29, 1945, page 1051.

The two standard freight locomotives are essentially of the same design, both being of the 2-8-0 type with their construction adjusted to wartime conditions of manufacture. The Series 52 locomotive was built in 1942 and has a boiler pressure of 227 lb. per sq. in. and in a maximum tractive force of 50,320 lb. The Series 42 locomotive was built in 1944 and has a tractive force of 56,000 lb. with the same boiler pressure. Because of the manpower and material shortages many hundreds of component parts were eliminated or modified which resulted in a savings of 6,000 man-hours and 26 metric tons of material in the construction of both classes of locomotives as compared to prewar Series 50 locomotives.

Diesel-Hydraulic Switcher — The Diesel-hydraulic switching locomotive was built at Strassburg by Maschinenbau & Bahnbedarf. It develops 350 hp. at 600 r.p.m. and is designed to operate at a maximum speed of approximately 40 m.p.h. The six-cylinder four-cycle Diesel engine has a bore of 9¾ in. and a stroke of 13¾ in. and is equipped with a Bosch fuel injection system. The engine is connected through a hydraulic transmission to one driving axle. Side rods connect the three pairs of driving wheels.

The narrow-gauge steam locomotive was built by Jung Locomotive Works for the German Army. It is a 0-6-0 type locomotive with a maximum speed of 18¾ m.p.h. and operates on a track gauge of 29⅝ in.

All of the freight cars at the exhibit were equipped with Hildebrand-Knorr empty-and-load brakes. The box-car air brakes could also be adjusted for either freight or passenger service, both changes being made by operating small levers located near the side sill. Other features of the freight cars were the ball and socket center plates using no center pins, the wick-feed lubricators for the journal boxes and the use of T-head bolts with the claws of the T forged downward for holding wood siding in place. The lubricators were of very light construction, using a metal pan for holding the oil and a yarn pad held against the journal by a spring with the yarn ends passing through the pad plate into the oil pan.

The standard box car was built at Konisberg, Germany, in 1943. It has a light weight of 28,500 lb., a load limit of 33,000 lb. and a maximum capacity of 38,800 lb.

The 16,645-gallon all-welded cistern of the tank car acts as the underframe for the car. The dome cap is equipped with a single locking device and with one safety valve. The outlet valve is located underneath the car and is joined to a Y-pipe permitting hose connections to be made to either side of the car. The car trucks are also of all-welded construction. The car has a light weight of 40,238 lb.

The high-side gondola is equipped with hinged end gates. This car has a light weight of 22,800 lb., a load limit of 54,000 lb. and a maximum capacity of 56,200 lb.

The flat car was built for carrying armored vehicles and one feature of this car is the adjustable permanent blocking which made it adaptable for transport of either the Tiger or Panzer tanks. The bolts holding the blocking fit into steel grooved plates running crosswise in the car floor which permits adjustment of the blocking either in or out. The car has a light weight of 49,823 lb., a load limit of 176,400 lb. and a maximum capacity of 180,800 lb.

The Marine Exhibit—A marine exhibit was also included with the rail exhibit. It included many Diesel engines, most of which were designed for use in boats although a few were built to power trucks, auxiliary equipment, and switching locomotives.

(Continued on page 581)

Carriers Open Case Before Wage Boards

Comprehensive presentation by Parmelee follows close of employee testimony

Hearings in the arbitration case of the non-operating employees were continued on March 5, with the presentation of evidence by representatives of the unions. The entire session was devoted to cross-examination of E. L. Oliver, labor relations consultant and economic analyst, who appeared previously as the principal witness for the employees. Concerning Mr. Oliver's exhibit on the financial results of the railways, W. T. Faricy, vice-president and general counsel of the Chicago & North Western, attorney for the carriers, brought out the fact that of that portion of the railway's gross revenue left after providing for taxes, materials and depreciation, the employees' share had risen from 65.2 per cent in 1941, to 73.8 per cent in the twelve month ended Junie 30, 1945, while the investors' portion had fallen from 34.8 per cent in 1941 to 26.2 per cent in 1945.

Mr. Faricy also developed the fact that in making comparisons of average hourly earnings of railway employees and the employees of other industries, the hourly earnings of outside employees had been inflated in recent years due to the effects of the mandatory war-time 48-hr. week, while at the same time premium payments for overtime began after 40-hr. In comparison, the witness admitted that there was probably less penalty overtime in the average hourly earnings of railway employees.

Traffic Units Per Man-Hour—With reference to the increased amount of traffic produced per employee, Mr. Faricy secured an admission from the witness that using 1936 as an index of 100 per cent, the index of traffic units produced per man-hour by all railway employees had risen to 123.7 in 1944, while the index of hourly earnings, by Mr. Oliver's own calculations, for non-operating railway employees had risen to 149.1 in 1944. Among the other exhibits covered in the cross examination were those dealing with safety, the Heller budget, and the relationship betweeen better utilization of plant and equipment and employee efficiency and the proper measurement of the increase in the cost of living due to war-time conditions.

Final presentation of evidence in favor of the employees was made on March 6, with B. M. Jewell, chairman of the employees' National Conference Committee of the 15 co-operating railway labor organizations, which is handling the wage dispute for the employees, and president of the Railway Employees Department, American Federation of Labor, appearing as the sole witness for the day. Mr. Jewell stated that there had been a considerable loss in take-home pay among the non-operating employees since the end of the war due to down-grading and return to the 48-hr. week which is general

in the industry in place of a 60-hr. week, which he claimed was normal during wartime.

Mr. Jewell, in his testimony, charged that railroad man-power shortages during the war were the result of the differences in wage rates between the roads and war industries. He also appealed to the board to consider the "inequity" suffered by the non-operating employees as a result of the 1922 wage reductions, which he said, did not apply to the operating group, and which, according to Mr. Jewell, had never been overcome. The witness asserted that this "inequity" was the reason the railroads were unable to settle their wage disputes on an industry-wide basis, and he asked the board to apportion, in its award, that part of any increase it grants that is due to correction of the 1922 "inequity" separately from the rest in order to "get it out of the picture, and get our men satisfied that this one thing has been taken care of."

Sentiment for "Direct Action"—In a general discussion of past wage procedures under the Railway Labor Act, Mr. Jewell said that the employees represented by him were becoming dissatisfied with the results obtained by accepting the findings of emergency boards and that this was one reason the representatives had decided to try arbitration. He declared that, although he did not want to appear to be threatening the board with possible strike action, there was a growing sentiment among the employees for direct action as many appear to believe that more favorable results can be secured by that method than under the procedures prescribed by the Act.

Final testimony in behalf of the employees in the operating union's wage case likewise was made on March 6, with H. W. Fraser, president of the Order of Railway Conductors; T. C. Cashen, president of the Switchmen's Union of North America; and D. B. Robertson, president of the Brotherhood of Locomotive Firemen and Enginemen, appearing as witnesses. Each made a summary of the case for the employees, applying their testimony specifically to the individual organizations represented by them. In addition, Mr. Cashen went to some lengths to justify the proposed increase as being essential to the economy of the nation as a whole. Mr. Cashen, who was a member of the War Mobilization and Reconversion Advisory Board appointed by the late President Roosevelt, which board achieved considerable notoriety from press reports stating that the board believed that wages throughout the nation could be increased by 24 cents without increasing prices, asserted that the board "recognized that we can never go back to the point where our national income was around $50 billion or $60 billion. We must have an income in this country that will produce not $50 billion or $60 billion national income, but $150 billion. Our national debt is over $279 billion and the best information we can get indicates that it is going to be over $300 billion. The carrying charges on it alone will bring us up to $8 billion and $9 billion." Mr. Cashen asserted that approximately 93 per cent of the nation's production consists of consumer goods and that therefore, to achieve the national income believed necessary by the War Mobilization and Reconversion Board increased wages are necessary to stimulate the economy.

Mr. Robertson claimed that in every railway wage movement since 1921, the carriers had made estimates of the anticipated costs of wage increase, which results had always proved erroneous as, in spite of the increases that have been granted, the costs per unit of traffic and the average revenue per ton-mile have shown a steady decline. He expects that if the requested increases are granted either in whole or in part, the carriers will soon find ways to overcome them.

Dr. Parmelee Testifies—Presentation of testimony in behalf of the carriers in the wage cases of the three operating brotherhoods and the fifteen co-operating non-operating railway labor organizations began before the two arbitration boards, sitting in joint session, on March 7, and not on March 6, as erroneously reported in the *Railway Age* of March 9. Dr. Julius H. Parmelee, director of the Bureau of Railway Economics, appeared as the day's sole witness, testifying in behalf of the railways. In his opening statement, Dr. Parmelee said in part, "The principal post-war concern of the railroads is centered on the volume of traffic they can obtain, and the cost levels at which they will be able to handle such volume. A large proportion of the costs of railroad operation consists of wages. Prospective costs and wage rates must, therefore, occupy an important place in any survey of the post-war railroad position."

Dr. Parmelee's first exhibit was designed to "set forth the past and present record of the railroads and their prospects as well" and dealt with traffic, earnings, costs and performances. Dr. Parmelee said that rail freight traffic, in ton-miles, reached an all time peak in 1944, but that 1945's total of 681 billion ton-miles represented a decline of 8 per cent under 1944. Considering 1945 separately, he said that for the first seven months of the year, up to the end of the war with Japan, total ton-miles handled were only 1.3 per cent under the same period of 1944, but that during the last five months of the year, the decline was about 17 per cent. The witness also said that the research staff of the Interstate Commerce Commission estimated that railway traffic in the first post-war year would total 465 billion ton-miles, 480.3 billion in the second such year, and 491.7 billion ton-miles in the third post-war year, an annual average of 479 billion ton-miles for the period, 7 per cent above 1929, the previous peak year prior to World War II, slightly greater than the 475 billion ton-miles of 1941, and 35 per cent and 30 per cent, respectively, under the totals for 1944 and 1945.

Concerning passenger traffic, Dr. Parmelee said that the all-time peak in this business was also reached in 1944, decreasing "moderately" in 1945. The I. C. C.'s estimates for future passenger traffic levels, he said, are 42.9 billion passenger-miles in the first post-war year, 38.3 billion in the second, and 36.1 billion in the third, or an annual average of 39.1 billion passenger miles, or nearly 60 per cent below the level of either 1944 or 1945. Dr. Parmelee declared that if 1941's traffic had been handled at January 1, 1946 costs, but not taking into consideration either the increased material prices since January 1 of this year or the cost of the wage rises now being asked, the railways would have had a net deficit of $255 million in place of the net income of $500 million, actually earned in 1941.

Cost Increases Since 1941—In making this estimate, he said that the average straight time rate of pay to railroad employees had increased 20.9 per cent since 1941, and that the total wage bill, including the cost of vacations, had increased by $509 millions; the cost of materials and supplies had risen by $345 million, or 29.8 per cent; mandatory depreciation by $100 million; these three items of expense increasing a total of $954 million or 26.0 per cent, while the operating ratio would have been increased from 1941's actual of 68.5 per cent to 86.4 per cent. In addition, because of higher wage rates, payroll taxes would have to be increased by $37 million. On the other hand, such a restating of costs would reduce federal income taxes by $134 million. The final result according to Dr. Parmelee would be a reduction in net railway operating income from 1941's actual of $998 million to an estimated $141 million, and a net deficit of $255 million instead of a net income of $500 million, even after allowance is made for a reduction of $102 million in interest charges that the solvent roads have made since 1941.

For the year 1946, Dr. Parmelee estimated that operating revenues will total $6.8 billion, or $2.6 billion below 1944 and $2.1 billion under 1945, while operating expenses are expected to total $5.2 billion, giving an operating ratio of 76.5 per cent. In making this estimate, the witness said there were no allowances for changes in wage rates or material prices after January 1, 1946. Taxes for 1946 are estimated by the witness at $685 million, consisting of $210 million of payroll taxes, $190 million of federal income taxes and $285 million of other taxes. Equipment and joint facility rentals are expected to total an additional $165 million, leaving a net railway operating income of about $750 million and producing a rate of return on property investment of 3.2 per cent. Dr. Parmelee estimated other income at $175 million in 1946 and miscellaneous deductions at $35 million, so that the total available for fixed charges he believes will be approximately $890 million, which, after deduction of $560 million for fixed charges, leaves net income of $330 million, as compared with actual net income for 1945 of $453 million.

Dr. Parmelee also devoted considerable time to an explanation of the effects of the war on traffic of the past few years and probable future trends. According to the witness, during the war the revenues derived from freight traffic increased to approximately twice the level of the index of the number of tons handled, due, he said, primarily to longer hauls and the vast increase in certain items of high rated traffic essential to the prosecution of the war. With the movement of war traffic now ended, Dr. Parmelee expects the characteristics of the traffic with relation

to lengths of haul and commodities handled to revert to the pattern prevalent in 1939 and 1940 so that revenue may be expected to decline much more rapidly than the number of tons handled. Illustrative of that point, he said that the average haul of rail freight increased from 351 miles in 1940 to 473 miles in 1944. With respect to the average revenue per car of freight, Dr. Parmelee said that manufactures was the greatest revenue producer in 1944, and that the commodities in that group contributed 54.0 per cent of all freight revenues in 1944 compared with 41.9 per cent in 1940, while the proportion contributed by products of mines, the lowest per car revenue producer was only 23.5 per cent in 1944, against 34.5 per cent in 1940.

Unit Costs Up—With respect to operating expenses, Dr. Parmelee testified that it cost the railroads in operating expenses $6.15 to handle 1,000 revenue ton-miles in 1940 and $6.44 in 1944. The unit cost per freight train mile during the same period rose from $4.77 to $6.79. In passenger service, he said, operating expense per car mile increased from 25.9 cents in 1940 to 32.8 cents in 1944, and per train mile from $1.99 in 1940 to $3.21 in 1944, the latter figure being the highest cost per passenger train mile since 1921. Discussing this section of his exhibit, Dr. Parmelee said, "Other things being equal, the ratio of expense to revenue tends to be greater in times of light than of heavy traffic, because about one-fourth of total operating expenses are relatively fixed and do not vary with the amount of traffic handled. With prospective reductions in post-war railroad traffic, certain economies that resulted from the large traffic volume handled during the war will cease to be realized. Average load per car will almost certainly be less than it was during the war, tons per train will not be so great, the average haul of freight will recede to more nearly normal levels, and other factors that aided in a reduction in unit operating costs will wholly or largely disappear.

"Thus rail carriers are faced with further increases in unit costs that will affect much, if not all, of the economies developed over the years as a result of large capital expenditures for additions and improvements to plant facilities."

Dr. Parmelee estimated the present investment in Class I railways, including working capital at $28 billion, or $23.3 billion after depreciation. To service this investment adequately he declared that a net railway operating income of not less than one billion dollars in required in order to pay interest charges, keep the railroad plant up to modern and progressive standards and maintain railroad credit.

Credit Must Be Maintained—Fixed and contingent interest charges of Class I railroads, he said, approximated $580 million in 1945, and will probably average about $550 million annually in the immediate post-war period and $535 million when reorganizations now in process have been fully consummated. For improvement of plant he estimated annual requirements from current earnings at $264 million, the difference between that figure and the estimated gross annual expenditure of $527 million for new plant, to come out of depreciation reserves. To these items he added $246 million for dividend requirements, the amount actually paid in 1944, which he said was the minimum annual requirements to maintain railroad credit.

Dr. Parmelee asserted that to modernize the railroad plant, the roads should assume an average life of not more than 30 years for freight cars and 40 years for locomotives, giving annual replacement requirements to maintain ownership of 58,800 freight cars normally, and, to make up war-time deficits, 90,000 freight cars during each of the next five years, at a total annual cost of $270 million. Normal locomotive replacements are estimated at 1,090 units each year at a cost of about $150 million. Expenditures for new passenger cars, he believes, should average about $75 million per year annually for the next five years, and $300 million a year for improvements to roadway and structures.

Dr. Parmelee also made a comparison between the carrier's war-time dividend record and wage increases granted during that period. During the years 1941 to 1944, he said, dividends averaged $213 million annually, while at the same time wage increases granted in 1943 added $360 million to the roads' wage bill in one year, a sum that was greater than the total dividends paid in any year in that period.

Expenditures Set Stage for War-time Performance—Concluding his testimony for the day Dr. Parmelee said that in the eight years from 1923 to 1930, inclusive, capital expenditures by Class I railroads everaged $800 million, annually, the same rate estimated by him as being necessary to maintain and improve the plant in the future, were materially slowed down from 1931 to 1938, then rose to an annual average of $464 million from 1939 to 1944. It was these capital expenditures, Dr. Parmelee declared, that made it possible for the carriers to handle successfully the enormous volume of traffic incident to the war. Because of these expenditures he said the roads were able to increase the average load in tons per car from 42.5 tons in 1921 to 50.8 tons in 1944, the average freight train load from 651 tons in 1921 to 1,138 tons in 1944, and the average freight train speed from 11.5 m.p.h. in 1921 to 15.7 m.p.h. in 1944.

The arbitration hearings were resumed on March 8, with Dr. Parmelee again the sole witness for the day. Dr. Parmelee said that over the past 30 years there had been a definite relationship between wages and railway rates, claiming that except in two instances when changes in traffic volume offset the effects of wage adjustments, every wage adjustment had been followed by a corresponding adjustment in either freight or passenger rates, or both. If the full amount of the war time increases in wages and material costs are covered, he declared, it will be necessary to add approximately $800 million to the total estimated annual revenue for the first three post-war years, or an increase in freight rates of 17.1 per cent. If to this is added the estimated $920 million cost of the present wage demands, an additional freight rate increase of 19.7 per cent will be required, or a total rate increase of 36.8 per cent, and even then there would be no allowance for rises in costs of materials and supplies which became effective after January 1, 1946.

Competition Precludes Large Rate Increase—Dr. Parmelee expressed doubt that such a large increase in rail rates could be effected without driving much traffic to competing transportation agencies. In a discussion of the productivity of railway labor, Dr. Parmelee asserted that $500 million annual expenditure for capital improvements was largely responsible for the increased output per man-hour of railway employees. The tremendous gains in this field during the past four years, he declared, were primarily the result of record traffic levels and operating practices which, while desirable in war-time, could not be carried over into normal operations. Taking the same basis of calculations as those used by E. L. Oliver, one of the principal witnesses for the employees, Dr. Parmelee said that traffic units per employee hour averaged 242.1 in the first ten months of 1945, compared with 257.6 in the same period of 1944, and added that the productivity level of 1941, which was more than 30 per cent less than in 1944, is indicative of the probable future trend.

On a basis of wage costs, Dr. Parmelee said that in 1936 the wage bill of all operating employees per train-mile was 61.6 cents, in 1940 it was 67.1 cents, and in 1944 it was 94.7 cents. The wage cost, including all employees, per 1,000 gross ton-miles rose from $1.23 in 1936 to $1.51 in 1944. For the employees engaged in maintaining tracks and structures, the wage costs per mile of track were $574 in 1936 and $1,463 in 1944. Wage costs of shop craft and related employees, per 1,000 locomotive and car miles, rose from $16.09 in 1936 to $22.40 in 1944. Dr. Parmelee testified that since 1929, the average hourly earnings of operating employees had increased by 37.4 per cent to 1944, and of non-operating employees by 54.2 per cent. In contrast, he said, the rate of return on railroad property investment has dropped from 5.23 per cent in 1929 to 4.74 per cent in 1944 and to 3.64 per cent in 1945. According to Interstate Commerce Commission statistics, he added, labor's share of railroad income was 65.2 per cent in 1941, while the investor's portion was 34.8 per cent. In the year ending June 30, 1945, the proportions had changed so that labor was receiving 73.8 per cent of income, against 26.2 per cent for the investor.

Cleveland on Competition—At the hearings on March 9, Dr. Parmelee was subjected to cross-examination by the attorneys for the organizations, following which A. F. Cleveland, vice-president—traffic, Association of American Railroads, took the stand as a witness for the carriers. Mr. Cleveland presented various statistics in evidence designed to show the rapid growth of water, air and highway transport during the past 25 years. In his discussion of the future he said it seemed likely that the air lines would set a definite ceiling on first-class rail fares, plus Pullman, and that they would even effect the coach rates that the roads could expect to charge for travel distances of 200 miles or more. In the field of freight traffic

he said that not only did rail lines face competition of for-hire waterway and highway operators, but that also competition for private carriers set a definite upper limit on certain freight rates.

In concluding his testimony for the day, Mr. Cleveland declared, speaking of the "fundamental factor" governing competition between the railroads and other carriers, "it is price and price alone. Shippers use the water carriers, for example, not because the service is slow but because generally speaking the price is less. The railroads must every day consider the price of their service as compared with the prices of the service rendered by their competitors. Railroads in order to maintain a large volume of passenger traffic and freight tonnage for their lines must be in a position to make their rates as nearly competitive as conditions will justify. They must in addition provide a service superior to any service that they have ever had heretofore. Any increase in the rates of railroads to the extent of that increase makes it more difficult for railroads to compete with these other agencies of transportation. Any increases in rates which, of course, would affect directly the ability of the railroad to meet competition must be held to the lowest possible level consistent with the cost of furnishing the service. This is just as much in the interest of all of the employees of the railroads as it is in the interest of the owners of the railroads. Because the volume of traffic handled has much to do with the number of men the railroad company employs."

Effect of Cost Increase—Asked what would be the effect of a substantial increase in the cost of rail transportation in a period of declining traffic, Mr. Cleveland declared that a railroad traffic executive "must consider first what the prospective volume of traffic will be and second whether that traffic at the existing rates will, in view of the costs of performing the service, provide an adequate net railway operating income. If it will not, there is but one way in which such a situation can be met and that is by a general increase in rates that will meet the increased costs and provide an adequate net railway operating income. The effect of such a general increase upon the traffic as a whole and upon movement of particular commodities will have to be closely watched. It may be necessary in many cases to make readjustments in rates where it is found that increased rates actually repel traffic. The railroads cannot risk in the coming years such low levels of net railway operating income as they had in the decade of the 'thirties. Neither can the nation do so. This nation cannot have the kind of efficient service which is required both in times of peace and in times of war; it cannot expect the railroads to maintain a plant that has the expansive capacity which the past four years have demonstrated the railroad plant possesses, unless the railroads have adequate income. The railroads must be supported; their support comes wholly from the revenues they receive. Any substantial increase in railroad costs would have to be accompanied by increases in rates when it develops that the volume of traffic in the light of the increased costs is insufficient to provide an adequate net railway operating income. Increases in railroads costs which make necessary increases in rates will, as I have just said, make it that much more difficult for the railroads to compete with other agencies of transportation and to secure that proportion of the traffic of the nation which the railroads ought to have as the backbone of the transportation agencies of the country."

Mr. Cleveland continued his testimony in the proceedings on March 11 with a discussion of land grant rates, following which he was subjected to cross-examination. The only other witness for the day was Earl B. Perry, manager of personnel New York, New Haven & Hartford, also appearing on behalf of the carriers, who testified concerning the dual basis of pay for certain operating employees, milage limitations, and the history of standard basis rates of pay for both operating and non-operating employees.

North Western Accepts First Post-War Passenger Car

With a bottle of beer substituting for the more conventional champagne as a christening agent, the Chicago & North Western accepted delivery of its first post-war passenger car at Milwaukee, Wis., on March 7. The car, a new streamlined coach which is the first of 20 ordered by the North Western and the first to be delivered to a western road, was built by the Pullman-Standard Car Manufacturing Company and was placed in immediate service.

E. Glen Six, president of the Milwaukee Association of Commerce, acted as master of ceremonies and the onlookers including Mayor John L. Bohn of Milwaukee, R. L. Williams, president of the North Western, and R. E. Medland, assistant to the president of Pullman-Standard. The bottle of Milwaukee beer was broken over the coupling of the coach by Miss Ruth Vogt, of the Milwaukee Association of Commerce.

The new car is 85 ft. in length and is painted in the yellow and green of the North Western "400" fleet. It is built of high-tensile, low-alloy steel of welded construction. Comfortable riding is provided by the use of rubber draft gears, tightlock couplers and four-wheel trucks of coil-spring design with roller bearings, unit clasp brakes and vertical shock absorbers. The interior seats 56 persons, and is equipped with reclining seats and individual lights.

British Roads Offer Services From Airports

Trans-Atlantic air passengers will benefit from connecting services in operation from the British airports to various destinations. Two special trains are now operated by the Southern to carry travelers landing at Poole and Hurn to London.

Passengers landing at Shannon airport in Eire may shuttle to London by air, or go by bus to Limerick, from which bus and rail connections are available to all parts of Eire.

Transportation Industry Praised by O. D. T. Head

At a luncheon meeting of the New York chapter of the Army Transportation Association held at the Hotel Astor, New York, on March 7, Colonel J. Monroe Johnson, director of the Office of Defense Transportation, paid tribute to the war record of the men and women of the nation's transporta-

First post-war car for a western road is christened

Miss Ruth Vogt, Milwaukee Association of Commerce, smashes bottle of beer against coupler of the first post-war car to be delivered to the Chicago & North Western from the Pullman-Standard Car Manufacturing Company at Milwaukee, Wis. Looking on are (left to right) E. Glen Six, president of the Milwaukee Association of Commerce; R. E. Medland, assistant to the president of Pullman-Standard; R. L. Williams, president of the North Western and Mayor John L. Bohn of Milwaukee.

tion industry. Colonel Johnson told 500 guests that none worked more cooperatively and effectively with the government than the railroads and air and trucking concerns, and that this time the government had sufficient intelligence to leave the operation of transportation to experienced hands. The luncheon also was a farewell meeting to honor Col. E. C. R. Lasher, president of the New York branch of the association, who has been transferred to Washington, D. C., as chief of the commercial traffic service of the Army Transportation Corps. He has been succeeded by Col. Donald S. McConnaughy.

St. Lawrence Seaway Project Subject of Radio Debate

The effect on the nation's railroads was one of the topics introduced in a lively radio debate on the St. Lawrence Seaway project between Senator Leverett Saltonstall, Republican of Massachusetts, and Representative William A. Pittenger, Republican of Minnesota, on a network program presented by the National Broadcasting Company March 9 as part of its "University of the Air" series.

Senator Saltonstall told listeners that, if ocean-going vessels start to use the waterway, trade ordinarily going through New England would be cut off, affecting many railroads in that area, but Representative Pittenger declared the seaway would "make it possible to export products which can't be shipped out profitably by rail" and that "very little traffic" would be diverted from railroads. He compared the railroads' opposition to the project to the opposition voiced by stage coach and toll road owners against the first railroads, and "explained" that the seaway would "relieve" railroads from building extra box cars for seasonal duty during the peak of grain shipments.

Buckwalter Awarded Henderson Gold Medal

The 1946 winner of the George R. Henderson gold medal of The Franklin Institute is Tracy Vero Buckwalter, according to an announcement on March 11 by Dr. Henry Butler Allen, secretary and director of the institute. Mr. Buckwalter will receive the award "in consideration of his accomplishments in applying anti-friction bearings to railroad locomotives and cars thus contributing to the increase in reliability and decrease in maintenance costs of modern railroad equipment."

The Henderson medal was first awarded in 1928 to William F. Kiesel, Jr., for inventions in locomotive and railway car design and construction. It is given in recognition of meritorious inventions or discoveries in the field of railway engineering.

Mr. Buckwalter, who until last year was vice-president of the Timken Roller Bearing Company, of Canton, Ohio, was born in Jersey Shore, Pa., in 1880. Following graduation from the Woodward High School, Clearfield Co., Pa., he became an apprentice to an electrical contractor in Philadelphia. In 1900 he entered the employ of the Pennsylvania, working his way up through the machine shops to become gang foreman and eventually foreman of the electrical drawing room. During his service with that road he secured 26 patents covering a wide variety of subjects, all of them related to the design of electric baggage trucks, now used in shops, warehouses, railroad stations, and other industrial establishments. He also developed the internal combustion (gas-electric) locomotive.

Freight Car Loadings

Loadings of revenue freight for the week ended March 9 total 786,202, the Association of American Railroads announced on March 14. This was an increase of 3,805 cars or 0.5 per cent above the preceding week, an increase of 19,147 cars or 2.5 per cent above the corresponding week last year, and an increase of 5,937 or 0.8 per cent above the comparable 1944 week.

Loading of revenue freight for the week ended March 2 totaled 782,397 cars, and the summary for that week as compiled by the Car Service Division, A. A. R., follows:

Revenue Freight Car Loading

For the Week Ended Saturday, March 2, 1946

District	1946	1945	1944
Eastern	149,267	158,858	159,498
Allegheny	159,592	172,949	174,962
Pocahontas	57,470	52,091	52,699
Southern	135,917	127,838	124,148
Northwestern	89,645	81,551	86,982
Central Western	125,148	122,848	118,644
Southwestern	65,358	69,601	69,960
Total Western Districts	280,151	274,000	275,586
Total All Roads	782,397	785,736	786,893
Commodities:			
Grain and grain products	54,912	41,281	48,281
Livestock	16,659	13,983	15,059
Coal	185,275	162,696	171,127
Coke	12,948	15,315	14,883
Forest Products	42,588	41,053	43,180
Ore	9,457	14,393	13,475
Merchandise l.c.l.	121,643	107,320	104,911
Miscellaneous	338,915	389,695	375,977
March 2	782,397	785,736	786,893
February 23	723,281	772,396	780,984
February 16	707,054	784,703	774,237
February 9	713,240	755,032	793,181
February 2	723,135	739,956	805,714
Cumulative totals: 9 weeks	6,532,727	6,841,878	7,099,709

In Canada.—Carloadings for the week ended March 2 totaled 66,083 cars, as compared with 65,538 for the previous week and 67,657 cars for the corresponding week last year, according to the compilation of the Dominion Bureau of Statistics.

	Total Cars Loaded	Total Cars Rec'd from Connections
Totals for Canada:		
March 2, 1946	66,083	35,427
March 3, 1945	67,657	40,494
Cumulative Totals for Canada:		
March 2, 1946	582,714	308,073
March 3, 1945	578,551	319,494

Results of Pennsylvania's Safety Contest

Winner of the Pennsylvania's 20th annual employes' safety contest covering the year 1945, for the best general showing in all departments made by a major operating unit, was the Eastern region, with headquarters in Philadelphia, Pa., President M. W. Clement announced March 11. In the competition between the regional maintenance of equipment forces, the first place was won by the Altoona, Pa., works.

Among the general divisions of the road, the units next in size, first prize for the best showing in all departments went to the Central Pennsylvania division, with headquarters in Williamsport, Pa. In the contests among the superintendents' divisions, which are grouped in three classes according to sizes, the Maryland division, headquarters in Baltimore, was winner in group A; the Erie and Ashtabula division, headquarters in New Castle, Pa., in group B; and the Delmarva division, headquarters Cape Charles, Va., in group C.

All awards go to the unit with the lowest number of accidents in proportion to the total man-hours worked. The contests are held to promote safety by stimulating competitive efforts in making the best records for accident avoidance.

U. P. to Hold Photo Contest

A contest for amateur photographers in which cash prizes and other trophies totaling $4,500 will be given away, will be sponsored by the Union Pacific beginning on June 1 and closing on October 1. The event will be staged under the direction of Vincent H. Hunter, manager of the road's photographic department.

Black and white and color stills and the same types of movies will be eligible for prizes of $500, $200 and $100 for the still pictures, and prizes of $1,000, $500 and $20 for the motion pictures. Any person may enter the contest, the only stipulation being that the pictures they submit must have been taken in Zion, Bryce and Grand Canyon (North rim) National Parks, and Kaibab National Forest and Cedar Breaks national monument.

A. A. R. Disputes Berge's Anti-trust Suit Allegations

Supporting the denials of the western railroads that the anti-trust laws have been violated as charged by the Department of Justice, and also their request that the federal court at Lincoln, Neb., dismiss the department's suit on that account, the Association of American Railroads has filed with the court, for the association and certain of its officers and directors named as defendants in the case, a reply to the complaint and amended bill of particulars submitted by the department.

In addition to its support of the western roads as to denials of various allegations, and to its blanket denial that it has conspired to restrain or monopolize commerce, the association specifically denied certain charges of the department having to do with it particularly.

These denials applied, among others, to the following allegations: That the A. A. R. had taken any action with the purpose of preventing any western road from reducing rates or improving service; that rate-making organizations in the West or elsewhere "head up into and culminate in" the A. A. R. (which, the reply said, has nothing to do with the initiation of rates and no control over the activities of rate conferences); that the A. A. R. is a "supreme authority" in initiating rates; that it has sought to "prevent rate erosion by dominating and controlling freight rates"; that it constitutes the ultimate "or any" sanction whereby compliance by carriers with rate bureau decisions is secured; that any A. A. R. rules are designed to curb the right of

Selected Income and Balance-Sheet Items of Class I Steam Railways

Compiled from 132 reports (Form IBS) representing 136 steam railways
(Switching and Terminal Companies Not Included)

Income Items	All Class I Railways: For the month of November 1945	For the month of November 1944	For the eleven months of 1945	For the eleven months of 1944
1. Net railway operating income	$61,316,789	$91,405,446	$882,013,818	$1,033,355,585
2. Other income	19,713,219	22,829,860	169,227,295	172,170,131
3. Total income	81,030,008	114,235,306	1,051,241,113	1,205,525,716
4. Miscellaneous deductions from income	3,187,452	2,547,286	28,395,872	35,423,171
5. Income available for fixed charges	77,842,556	111,688,020	1,022,845,241	1,170,102,545
6. Fixed charges:				
6-01. Rent for leased roads and equipment	8,894,868	11,977,905	130,572,106	142,971,178
6-02. Interest deductions[1]	31,744,986	33,530,050	353,891,509	371,841,936
6-03. Other deductions	115,990	118,538	1,238,761	1,404,504
6-04. Total fixed charges	40,755,844	45,626,493	485,702,376	516,217,618
7. Income after fixed charges	37,086,712	66,061,527	537,142,865	653,884,927
8. Contingent charges	2,702,644	2,773,248	30,222,076	30,975,637
9. Net income[2]				
10. Depreciation (Way and structures and Equipment)	34,384,068	63,288,279	506,920,789	622,909,290
	28,026,065	26,925,602	305,770,746	294,428,586
11. Amortization of defense projects	39,829,015	17,519,103	431,056,842	172,149,247
12. Federal income taxes	*2,040,121	104,271,343	672,770,373	1,241,173,394
13. Dividend appropriations:				
On common stock	51,053,777	64,208,633	173,965,143	173,805,532
On preferred stock	6,479,931	10,277,006	42,825,994	49,671,657
Ratio of income to fixed charges	1.91	2.45	2.11	2.27

Selected Asset and Liability Items	All Class I Railways: Balance at end of November 1945	Balance at end of November 1944
17. Expenditures (gross) for additions and betterments—Road	$213,703,555	.....
18. Expenditures (gross) for additions and betterments—Equipment	262,299,241	.....
19. Investments in stocks, bonds, etc., other than those of affiliated companies (Total, Account 707)	553,922,574	$587,399,902
20. Other unadjusted debits	202,128,703	169,962,928
21. Cash	1,271,311,090	1,303,871,486
22. Temporary cash investments	1,768,651,870	1,887,803,029
23. Special deposits	205,316,089	204,239,775
24. Loans and bills receivable	521,122	447,188
25. Traffic and car-service balances—Dr.	37,253,335	46,213,506
26. Net balance receivable from agents and conductors	106,872,641	145,618,668
27. Miscellaneous accounts receivable	513,474,923	608,617,664
28. Materials and supplies	603,274,805	608,486,548
29. Interest and dividends receivable	44,789,034	39,177,537
30. Accrued accounts receivable	268,804,511	352,716,528
31. Other current assets	44,418,876	59,821,111
32. Total current assets (items 21 to 31)	4,864,688,296	5,257,013,040
40. Funded debt maturing within 6 months[3]	216,906,604	252,661,932
41. Loans and bills payable	11,207,419	11,588,386
42. Traffic and car-service balances—Cr.	168,667,205	204,975,338
43. Audited accounts and wages payable	523,569,620	532,277,732
44. Miscellaneous accounts payable	190,185,047	154,745,059
45. Interest matured unpaid	56,500,485	50,246,274
46. Dividends matured unpaid	8,137,890	7,595,797
47. Unmatured interest accrued	65,066,790	76,093,923
48. Unmatured dividends declared	74,918,405	77,808,792
49. Accrued accounts payable	218,552,834	259,289,265
50. Taxes accrued	1,330,494,623	1,940,424,938
51. Other current liabilities	149,069,959	76,631,079
52. Total current liabilities (items 41 to 51)	2,796,370,277	3,391,676,583
53. Analysis of taxes accrued:		
U. S. Government taxes	1,190,278,208	1,798,090,832
Other than U. S. Government taxes	140,216,415	142,334,106
54. Other unadjusted credits	418,108,062	356,324,799

[1] Represents accruals, including the amount in default.
[2] After deduction of the following amounts to create reserves for land grant deductions in dispute: Nov. 1945, $2,683,218; Nov. 1944, $3,811,594; 11 months of 1945, $40,597,149; 11 months of 1944, $41,930,710. Net income is also affected by charges to the amortization of defense projects accounts of $31,638,077 for November 1945 and $233,272,509 for the eleven months of 1945 in excess of normal accruals and credits to railway tax accruals of $25,587,416 and $168,092,417, respectively, resulting from the shortened period of amortization.
[3] Includes payments of principal of long-term debt (other than long-term debt in default) which will become due within six months after close of month of report.
* Decrease or deficit.
Compiled by the Bureau of Transport Economics and Statistics, Interstate Commerce Commission. Subject to revision.

every carrier to independent protest to the Interstate Commerce Commission about inequitable rates; that any "private system of judicature" culminates in the A. A. R.; that every important carrier must belong to the association; and that its members agree to be controlled by the A. A. R. or surrender their liberty of action in rate matters to it.

After pointing out that in the early days of the New Deal especially, when the effects of the depression were most severe, "there was a public demand and urgent need for coordinated and cooperative effort among the railroads," the reply outlined the organization and functions of the A. A. R.

"During the war period particularly," it went on to say, "the A. A. R. functioned cooperatively with the armed forces of the United States in handling war traffic and troops in such a way as to promote the war effort, in a manner which was entirely satisfactory to those charged with responsibility for carrying on the war. From time to time, the heads of the War and Navy departments have publicly expressed their satisfaction at the manner in which the A. A. R. performed its duties and numerous public statements were made by the heads of the transportation departments of the War and Navy to the effect that it would have been impossible to carry on the war successfully if no such organization had been in existence."

Continuing, the association expressed the belief that, if it or a like organization had not been in existence during the late war, "it would probably have been necessary for the government to take over the railroads and operate them, as they did in the first World War, with the result that the expense of the war would have been greatly increased and the operating efficiency of the railroads greatly impaired."

German Equipment Exhibited by Army

(Continued from page 576)

Marine Diesels of interest were an eight-cylinder, four-cycle Raumboot engine developing 900 hp. at 700 r.p.m., a Klockner Humbolt Dentz 300-hp. engine of the two-cycle type, an M.A.N. submarine supercharged engine developing 2,000 hp. at 520 r.p.m., and a Mercedes Benz V-20 engine, also supercharged, which delivers 2,500 hp. at 1,630 r.p.m.

Three Diesel engines for light switching locomotives included the 112-hp. and 36-hp. Klockner Humbolt Dentz engines, both being of the six-cylinder four-cycle type and a 107-hp. four-cylinder M.A.N. engine operating with a four-stroke cycle. All power ratings are given in metric horsepower.

A special feature of the exhibit was a 135-ft. German minesweeper powered with two M.A.N. 900-hp. Diesel engines which drive two Voith-Schneider propeller units. These units consist of vertical blades rotating around a vertical axis which eliminate the need for a rudder as they simultaneously propel and steer a ship. The maneuverability of the ship was demonstrated during short runs in Chesapeake Bay.

All of the equipment is available for future inspection by representatives of science and industry. Special arrangements for examining the items can be made through the Office of the Publication Board, Department of Commerce, Washington, D. C.

Microfilms of charts and diagrams will be available on order to O. P. B. Charts and diagrams of some German equipment that was not shipped to the United States also are available, and photostat and microfilm copies may be ordered.

Missouri Pacific to Test Radio on 200-Mile Stretch of Track

As a means of determining how much the movement of freight trains can be facilitated by the use of radio communication, the Missouri Pacific will shortly begin a series of tests on the 200-mile stretch of track between McGehee, Ark., and Alexandria, La. Announcement of the coming experiments was made after the railroad had been granted a radio frequency license by the Federal Communication Commission.

As part of the tests, engineers will install high frequency radio equipment on 15 locomotives and 15 cabooses and will install an inductive carrier system between the cabooses and seven wayside stations along the 200-mile route. With this set-up there will be available instant communication between conductors and enginemen and also between the conductors and one or more of the seven stations via the inductive system.

Officers of the road, in announcing the new tests, stressed the point that while the radio will supplement existing signal and other safety devices, it will not displace them or effect any change in the method of train operation. For the most part the section of track between McGehee and Alexandria is equipped with automatic block signals.

Subsidized Rivalry Protested by Pelley

(Continued from page 575)

Mr. Pelley said the need for commercial transportation services on highways, waterways and airways was not disputed, but the companies carrying on this sort of business should be subject to the same general principles which apply to railroads and other types of businesses.

No Adequate User Charges—"I am not criticising the policy of providing waterways, airways and highways at public expense," he said. "They are public thoroughfares, though no more essential in their public service than are railroad tracks. These publicly provided facilities are also used for the business of commerciol transportation—which is no more public in its nature than is the business of a railroad company—without requiring adequate charges for the use of public property for private profit."

The speaker stressed that valid objection may be taken to this policy, however, not only by railroads, but also by taxpayers in general, the effect of such a policy being "to shift more and more of the nation's resources of the nation from the category of tax-paying property to tax-free property upon which taxes must be spent."

Pointing out that in the 20 years preceding World War II public expenditures on tax-free highways, airports, and navigation facilities were considerably more than the total invested in railroads in more than a century, Mr. Pelley said that "taxpayers in general have a direct interest in this increasing tendency to shrink the tax base upon which the support of the government depends and so to add to their own necessary tax payments."

"Railroads have a special and double interest," he added, "both as substantial taxpayers and as transportation enterprises which provide and maintain the facilities they use at their own expense, while competing with others who are favored by the use of facilities furnished at public expense without the requirement of adequate charges for their commercial use.

No Kickback On Rail Taxes—"Railroads pay state and local taxes amounting to more than $1,200 per mile per year," he said, "and those taxes are not spent for the direct benefit of the railroads, but go toward supporting the general public services of the government." He pointed out that during World War II, railroad operations not only cost the taxpayers nothing, but brought the Treasury four billion dollars in taxes.

Turning to the future of the nation's railroads, Mr. Pelley insisted that they will still be needed and will be fundamental "in a nation of vast distances and immense productivity," resulting in a demand for transportation service unparalleled in quantity and variety. He predicted that changes in railroads will not be spectacular or conspicuous, but that their cumulative effect will be found and measured in overall results.

"It is important not only to railroads, but to all who are interested in transportation service and costs that railroads be in a position to handle volume traffic efficiently and at low cost," he concluded, stressing that the real question now is getting on the rails the volume of business necessary for efficient, low cost operation.

"The answer to that question depends partly upon the total production and traffic of the country and partly upon whether railroads are to be allowed an equal chance to compete on even terms for that part of this total traffic which they are inherently best fitted to haul," he said.

"The decision as to this," he added, "is a matter of public policy, something beyond the control of the railroads, which cannot determine the nature of the public policies which are to apply in the field of transportation. In the long run, it is the effect of these policies which will determine the kind of transportation we will have in this country."

Los Angeles General Agents Elect New Officers

At the annual meeting of the Railroad General Agents Association of Los Angeles, held on February 28 at Los Angeles, Cal., the following officers were elected for the ensuing year: President, A. A. Zastrow, general agent, Illinois Central; first vice-president, C. W. Hoefener, general agent, Chicago, Burlington & Quincy; second vice-president, L. G. Sills, division freight agent, Atchison, Topeka & Santa Fe; third vice-president, H. V. Gardner, general agent, Southern; secretary-treasurer, G. Servin, general agent, National of Mexico.

Conference on Forest Conservation

The importance of perpetual forests to the railroad industry was emphasized at the conference of wood and paper users, forest industries groups and state and federal governmental agencies, sponsored by the American Forest Products Industries, Inc., in New York on March 1. Attended by prominent American foresters and industry leaders, the meeting focused attention on the announced goal of the organization, that of growing trees as a crop on American woodlands to supply the future needs of the country.

Colonel William B. Greeley, chairman of the trustees of American Forest Products Industries, mentioned the part played in Pacific Northwest tree growing by transcontinental railroads which operate two of the country's most promising and scientifically managed tree farms.

S. E. Armstrong, engineer maintenance of way—system of the New York Central, representing the Association of American Railroads, corroborated Greeley's statements that railroads, as land owners and tree farmers, are interested in sustained yield tree growth and continued traffic from forest lands.

R. E. Dougherty, vice-president of the New York Central, spoke briefly on the interest of the railroad industry in the tree-growing program and stressed the part which railroads are playing in the conservation and proper use of lumber.

Advisory Board Meeting to Feature Debate

Open debate between New England shippers and ranking operating officers of New England railroads as to why "neither group is at present doing as good a job as they can" in preventing a freight car shortage here will be one of the features of a two-day session of the New England Shippers Advisory Board to be held in Springfield, Mass., on March 20 and 21.

Issuing a call for the meeting to be held at the Hotel Kimball, William H. Day, general chairman of the board, said that New England is faced with a serious freight car shortage "unless both the railroads and the shippers immediately improve their present performances in car handling".

The meeting will open on the evening of March 20 when the Traffic Club of Springfield will sponsor a dinner at which Laurence F. Whittemore, president of the Federal Reserve Bank of Boston, will be the speaker. Guest speaker at the luncheon on March 21 will be Frank J. Wall, vice-president of the New York, New Haven & Hartford. At the regular meeting of the board C. J. Goodyear, president of the National Association of Shippers Advisory Boards, will discuss "Current Transportation Conditions" and W. E. Callahan, manager, Open Top Section, Car Service Division, Association of American Railroads, will discuss "National Railroad Transportation Conditions".

Club Meetings

The Southern and Southwestern Railway Club has scheduled a meeting March 21 at 10 a. m. in Atlanta. C. M. Kimball, assistant to the vice-president, Southern Railway, will present a paper on "Safety."

The spring meeting of the Great Lakes Regional Advisory Board will be held at the Hotel Carter in Cleveland, March 19-20. Guest speaker will be Clifford F. Hood, president, American Steel and Wire Company. Reports by many committees comprise the program for the twenty-third annual meeting of thte Board.

The Indianapolis Car Inspection Association will meet April 1, at 7 p. m. in Room 403, Union Station, Indianapolis. The purpose of the meeting is a general discussion of the rules.

With the Government Agencies

Whitney Gives Fact Finders a Chance

Strike held up after Truman names emergency board; hearings are begun

Upon certification by the National Mediation Board that the dispute over wage increases and changes in working rules between the railroads and the Brotherhood of Railroad Trainmen and Brotherhood of Locomotive Engineers threatened substantially to interrupt interstate commerce, President Truman on March 8 by executive order created an emergency board, under the provisions of section 10 of the Railway Labor Act, to investigate the dispute.

The President designated Leif Erickson, former justice of the Montana supreme court, Frank M. Swacker, a New York attorney, and Gordon S. Watkins, dean of the college of letters and science, University of California at Los Angeles, as members of the board, and they proceeded promptly with the prescribed investigation. The executive order, following the terms of the act, provided that the board should report its findings within 30 days, and that from March 8 until 30 days after it has made its report to the President, no change in the condition out of which the dispute arose shall be made either by the carriers or the brotherhoods, except by agreement.

Upon announcement that an emergency board had been created, the leaders of the two brotherhoods postponed the strike which had been called for March 11, without prejudice to its being effected at a later date, it was pointed out, if the emergency board's report is not satisfactory to them.

Hearings Open in Chicago.—Hearings before the board began in Chicago on March 12, with opening statements by Ray T. Miller, Cleveland, Ohio, attorney for the labor organizations. This was followed, on March 13, by opening statements on behalf of the carriers, by Edwin A. Lucas, Philadelphia, Pa., appearing as attorney for the roads.

Meanwhile the threatened strike on the Central of New Jersey was averted when Dr. John R. Steelman of President Truman's staff persuaded A. F. Whitney, president of the Brotherhood of Railroad Trainmen, to issue a postponement order on the walk-out of trainmen which had been scheduled for March 11. President Truman had previously issued an order bringing the C. N. J. disputes under jurisdiction of the emergency board, and the Brotherhood of Locomotive Engineers announced postponement of its C. N. J. strike call on March 9. The B. of L. E. also stated that Dennis A. Giles, chairman of the Jersey Central division of the B. of R. T. was no longer a spokesman for the engineers. Mr. Giles had previously stated that both the operating brotherhoods would strike, regardless of Presidential intervention, unless the road agreed ahead of time to accept the wage and rule changes agreed upon by the operating brotherhoods and the other railroads.

The C. N. J. did not participate in union-management collective bargaining meetings in Chicago, and there was no formal breakdown of local collective bargaining when the operating unions walked out of the Chicago meetings, or at the time of Mr. Giles' original strike announcement (reported in *Railway Age*, February 16). E. T. Moore, general manager of the road, accused Mr. Giles of attempting to force it to accept the result of the emergency hearings sight unseen, whereas the operating brotherhoods had refused to participate in arbitration proceedings. In a final peace effort (before the President's inclusion of the road in the emergency board hearings) the C. N. J. offered to go along on any national wage adjustment, but insisted that working rules be negotiated locally. It was Mr. Moore's argument that the financial position of his road made it impossible to guarantee conformance with any future national pattern. The heads of both operating brotherhoods have stated that they will observe the 30-day waiting period called for in the Railway Labor Act.

Lower Coal Rate to Youngstown Upheld by I. C. C.

The Interstate Commerce Commission has issued a report by Commissioner Aitchison on reconsideration of the No. 28825 proceedings, affirming with "minor modifications" the findings of the original report, resulting in the prescription of lower rates on all-rail coal from the Pittsburgh, Freeport and Leetonia districts in Pennsylvania, and on ex-river coal from Conway, Pa., and Colona, for destinations in the Youngstown, Ohio, steel producing district. Petitions of the railroads for rehearing and reargument were denied, and they were directed to make the new rates effective May 1 on 30 days' notice.

The provisions of the prior report in this case were summarized in *Railway Age* of October 20, 1945, page 660. The "minor modifications" consist of the elimination of three points in Pennsylvania from the list of destinations to which the ex-river rates apply.

Commissioners Patterson and Porter again dissented from the majority's view, and the latter emphasized his concern over widening the spread between the Pittsburgh all-rail rate and the ex-river rate from 54 to 57 cents, the effect of which, he said, is to favor, "unduly as I view it," two large shippers, Republic Steel Corporation and Youngstown Sheet & Tube Company, "to the detriment of the all-rail shippers."

Consolidating Cases Held Sound Practice

Supreme Court approves I. C. C. procedure; reads lower court a lesson

The validity of two decisions of the Interstate Commerce Commission dealing with applications for authority to operate truck lines has been upheld by the Supreme Court of the United States in opinions made public this week. In one case, designated *U. S.* vs. *Pierce Auto Freight Lines*, the majority opinion was by Justice Rutledge, the dissent of Justice Douglas being noted. In the other case, *Akin* vs. *U. S.*, there was no written opinion, the decision upholding the commission's view being in the form of a *per curiam* order. Justice Jackson did not participate in either case.

The Pierce case came to the Supreme Court on appeal from a decision of a special federal district court against the commission, which decision was accompanied by an order remanding the proceeding to the commission for rehearing. The commission had authorized two truckers, Consolidated Freightways, Inc., and Oregon-Nevada-California Fast Freight, Inc., to extend their operations over the opposition of Pierce and two other truckers and of Pacific Motor Trucking Company, a highway affiliate of the Southern Pacific, and the Pacific Southwest Railroad Association.

Pierce Case Decision—In the words of Justice Rutledge, "the major thing in controversy is whether the appellants, Consolidated and O.N.C., properly were allowed by the commission to substitute wholly independent and competing through services between Portland, Ore., and San Francisco, Cal., for the service which they jointly rendered between those cities, prior to the filing of these applications, by interchanging freight at intermediate points. The protesting appellees were carriers competing with the joint service of Consolidated and O.N.C., and will be competitors with each, as those companies will be with each other."

The commission's authorization for the competing operations was given in a single Division 5 report, with one commissioner dissenting, after an examiner in separate reports had recommended denial of the two applications, the examiner's participation having resulted from the failure of the separate joint boards that originally considered the applications to agree on the recommendations to be made. The district court, said Justice Rutledge, objected to the way the two cases were treated by the commission after the hearings were completed, particularly to the division's consideration of the record in the two cases

(*Continued on page 588*)

1945 Fiscal Report of Mediation Board

It scolds unions for futile, "regrettable" quarrels over jurisdiction

Reiterating a view expressed in previous years, the National Mediation Board, in its annual report covering the fiscal year ended June 30, 1945, just made public, again has called attention to the "disproportionate amount of time and effort spent by its members and staff of mediators in handling representation disputes between national organizations competing for the right to represent the various crafts or classes of engine, train and yard service employees." Emphasis was put on the board's belief that "most of these disputes would never have arisen had the organizations involved exerted the same efforts to agree among themselves on interunion matters that the [Railway Labor] Act enjoins upon carriers and employees in the making and maintaining of labor agreements."

The year under review was marked by a "few local and unauthorized work stoppages," the report remarked, and by "only two authorized strikes," both due to wage disputes. These strikes were called, the report explained, after the "full procedures" under the act had been employed, including submission of the controversies to "emergency boards" selected under the provisions of section 10. It did not comment on the reasons why the machinery so employed did not succeed in avoiding strikes, nor did it explain on what basis agreements were reached so that, "after short interruptions to the operations of the carriers, settlements were effected and service was renewed."

554 Cases Closed—During the fiscal year 1945 the board received a total of 631 applications for its services, including 544 docketed as formal cases, and 62 applications disposed of through correspondence. During the year 554 cases on its docket were closed, representing a net gain of 10 cases against the "backlog" of open cases, which was 248 at the end of the year. These figures for the year 1945 compare with 431 cases docketed during fiscal 1944 and 357 disposed of in that year.

Commenting further on the prominence of jurisdictional disputes between unions in its proceedings, the board pointed out that "an outstanding feature in connection with this type of representation dispute is the large number of cases in which no change in representation has resulted—the challenging organization losing the election. The board's experience has shown that of the total number of employees participating in these elections, well over one-half have expressed themselves as desiring no change in the organization which had theretofore represented their interests. Such disputes are regrettable," the board declared, "not only from the standpoint of continued friction and ill feeling among the employees involved, but also for the demoralizing effect they exert on the cooperative efforts of men and management, and the morale of the service in the transportation industry.

"In addition to the deterioration of employee interunion relationships resulting from these representation disputes," said the board's report, "the controversies so aroused are often carried over into matters coming before the board for mediation. In such instances, which may truly be described as jurisdictional cases, settlements in mediation are extremely difficult, if not impossible, to obtain, and such issues have gone before emergency boards, due to strike threats made by one or another of the organizations. During the past fiscal year it became necessary to set up three emergency boards under section 10 of the act to consider matters which were in the most part jurisdictional disputes between two national organizations. It is the board's earnest hope," it was emphasized, "that the futility of such disputes will become so apparent to the membership of the organizations that they will gradually disappear."

Some Direct Negotiations End Too Soon—While the board takes the position that the percentage of dispositions of disputes by the "mediation process," including mediation agreements, withdrawals of applications for mediation, and agreements to arbitrate, is "an index to the measure of efficiency of the Railway Labor Act in the settlement of disputes," it went on to point out that, "although the parties to many mediation disputes have generally recognized the obligation imposed upon them by the Railway Labor Act to make every reasonable effort to compose their differences prior to invoking the services of this board, many situations have arisen where the direct conferences on numerous and important questions have been concluded in a few hours or days.

"Experience has demonstrated," it went on to say, "that complete negotiations in such instances cannot be conducted in short periods of time. In many situations of this nature, the board has urged resumption of conferences, either prior to or after the commencement of mediation. These efforts have resulted in considerable reductions in the number of items remaining to be mediated, and in some cases agreements have been reached by the parties without further need for the board's services. The desirability of thorough exploration of all issues in such disputes prior to their submission to this board cannot be too strongly emphasized," the report added.

Disputes involving representation of air line employees are increasing "in number and intensity," the board pointed out, and rules and wage disputes between the air carriers and organizations designated to represent their employees also have shown a "marked" increase. "During the past fiscal year organizational activities among air line employees increased appreciably," the report said, "and many problems were encountered in the handling of representation disputes which are peculiar to the air transport industry. . . . With the spread of representation among practically all groups of air line employees, an increasing portion of the board's mediatory services has been required in the handling of disputes involving rates of pay, rules and working conditions. Such requests for the board's services will increase materially in number as

(*Continued on page 587*)

Facts from Kendall on Grain Movement

Refutes claim of St. Lawrence advocates that railroads failed under load

Appearing at a hearing before a subcommittee of the Senate foreign relations committee on the St. Lawrence Seaway project as one of the final witnesses before its conclusion last week, W. C. Kendall, chairman of the Car Service Division of the Association of American Railroads, explained that his purpose was to put into the record the "true facts" as to the recent performance of the railroads and particularly to discuss, as their representative, certain testimony of proponents of the project to the effect that the railroads had "fallen down" in their duty as common carriers to move grain produced in this country.

Mr. Kendall reported that despite the all-time record production of grain crops during the past two years, the grain stocks on farms as of January 1, 1946, and 1945 were substantially below the average of the previous ten years, indicating that with the larger crops to move, the railroads have performed a much larger service to the grain shipping public during the past two years than during any other comparative previous period.

All Records Broken—He added that since 1943 grain and grain products carloadings have been the largest in the history of the railroads, with loadings for 1945 breaking all previous records. This high level of loading, it was explained, has been maintained during the first nine weeks of 1946.

"The total carloading for all roads during the first nine weeks of this year was 470,897 cars as compared with 383,921 in the corresponding 1945 period," he said, adding that the three Western districts had totaled 316,763 cars as compared with 257,190 in 1945. Referring to carloads of export grain unloaded at all ports, Mr. Kendall said that from 1939 through 1944, unloadings averaged 3,593 cars per month, while for the 11 months ending with February, 1946, the average has been 16,768 cars monthly.

In reference to a statement by Secretary of Agriculture Clinton Anderson that "commitments of wheat to Europe will be short 150,000 tons for February" and even shorter this month, Mr. Kendall pointed out that the export program called for a total of 1,039,800 tons for February, which amount included 188,700 tons carried over from previous months. "The shortage of 150,000 tons referred to does not appear so serious when measured against the total export commitment, which included the left-over item of 188,000 tons," Mr. Kendall said, stressing that the March program calls for export tonnage substantially equal to that of February and that it is not anticipated that any difficulty will be met in completing the program insofar as the rail movement is concerned.

Only 32 Elevators Blocked — In answer to testimony to the committee con-

cerning the alleged deterioration of wheat, presumably due to the shortage of cars, Mr. Kendall observed that wheat piled on the ground in the winter, either on farms or at country elevators, was not subject to loss or deterioration. And with reference to a statement that, at the end of February, "a thousand" western elevators were "plugged," he informed the committee that, as of February 28, 114 elevators, located on four railroads, were filled to capacity, but that that figure has since been reduced to 32. This fact, he pointed out, should be considered in the light of the existence of approximately 25,000 country elevators on all roads in the Western area.

In concluding his remarks before the commitee, Mr. Kendall said that the difficulty in moving grain during the latter part of 1945 and the early weeks of 1946 was due in part to the unprecedented troop movements originating on the West coast. "Railroads were dispatching daily from the three Pacific Coast port areas an average of over 50 troop trains a day," he explained, "which was in addition to their regular business. This meant an equivalent number of special trains of empty equipment moving in the opposite direction daily. The number of passenger carrying cars alone was approximately 600, not including dining, baggage and kitchen equipment."

He emphasized that the heavy troop movements also came at a time when unfavorable weather conditions often blocked rail lines and made it impossible to move, let alone load or unload freight cars. Manpower shortages during this period also hampered the servicing of passenger and freight trains, he added.

"The shortage, to the extent it existed, was not of box cars, but of transportation," Mr. Kendall concluded. "This situation occurs only during winter periods of unusual severity and at such times of the year when a seaway would be of no service as an aid to rail transportation."

Air Freight Costs Still Worry Government Economists

The relative merits of rail as compared to air freight for the conveyance of perishable goods produced in Florida and the immediate economic effects of the use of each type of transportation upon the consuming public are again discussed in the current issue of "The Marketing and Transportation Situation," prepared by the Bureau of Agricultural Economics of the Department of Agriculture.

The report concedes that, although air-freight may be more expeditious, many perishables are not suited to transportation by air, and a number of present air freight rates are too high to make the regular shipment of perishables a profitable venture.

In seeking an economic basis for commercial air transport of perishables, the bureau suggests that the lowest operating costs for an air-freight line "probably would be obtained" through adjusting operations during the period of a seasonal low supply of agricultural perishables by (1) hauling northward other perishable commodities, such as sea food from Florida or the Caribbean area; (2) reducing the number of flights so that as nearly as possible a full load may be hauled northward; (3) encouraging production of perishables that are harvested and sold during the season of usual short supply and (4) establishing air-freight concentration points to be located in intensive fruit and vegetable producing areas and in areas where the seasonal variation in production is at a minimum.

Federal Government to Bill Air Lines for Services?

The creation in the Civil Aeronautics Administration of a Plans and Performance Staff, directed by Alfred Hand, has been announced by administrator T. P. Wright. This staff will make studies on matters of general policy for the administrator, it was explained, one of its first assignments being to "devise procedures" whereby the C. A. A. can recapture for the federal Treasury "some of the money it expends on services to civil aviation."

This assignment, the announcement went on to say, is in line with the House appropriations committee's request that charges for "such safety regulation services as recordation and registration of aircraft" be instituted early in the fiscal year beginning next July 1, and that "a plan for institution of charges for federal airways services" be submitted by January 1, 1947.

I. C. C. Discontinues Its Motor Finance Section

The Interstate Commerce Commission announced this week that effective March 10 the section of finance of the Bureau of Motor Carriers will be discontinued. Its work and personnel will be assigned to other sections of the bureau. The work under section 214 of the Motor Carrier Act will be assigned to the Bureau of Finance. J. Edward Davey, chief, and Vernon V. Baker, assistant chief, of the section of finance, have been assigned to the section of complaints as examiners.

Truck-Forwarder Agreements under I. C. C. Study

Secretary W. P. Bartel announced this week that the Interstate Commerce Commission has instituted an investigation on its own motion to "determine and prescribe reasonable, just, and equitable terms and conditions under which agreements may be made for the utilization by freight forwarders of the services and instrumentalities of common carriers by motor vehicle."

This proceeding, docketed as No. 29493, has been undertaken in compliance with recent legislation requiring the commission to make such a determination, passage of which was reported in *Railway Age* of February 23, page 418. Existing forwarder-truck joint-rate arrangements may be continued, meanwhile, under the terms of the new legislation, which takes the form of a further amended section 409 of part IV of the Interstate Commerce Act.

With a view to expediting the case, the commission has invited interested parties to file with it, before April 15, memoranda or briefs containing their views as to the interpretation that should be placed on any of the provisions of section 409 as amended, along with suggestions as to conditions that should be prescribed and regulations that should be made by the commission to carry out the purposes of the statute.

Times and places for hearings in the proceeding will be fixed later.

Fined for Elkins Act Violation

According to advice received by the Interstate Commerce Commission and made public by Acting Secretary G. W. Laird, the Chicago & North Western on February 4 entered a plea of guilty to a one count information charging it with violation of the Elkins act, and paid a fine of $1,000 in the federal district court at Grand Rapids, Mich. The information charged that the road "willfully failed" strictly to observe its demurrage tariffs at Connerville, Mich., with respect to a carload shipment of coal, by failure to collect accrued demurrage charges. The matter was handled by the commission's Bureau of Inquiry.

Bulwinkle Bill Hearing Begins March 20

Hearings by the Senate interstate commerce committee on the so-called Bulwinkle bill (H. R. 2536), already approved by the House, are scheduled to begin March 20, Chairman Wheeler has stated. This measure is designed to afford a specific exemption from the operation of the anti-trust laws for rate-making procedures and other joint actions of carriers approved by the Interstate Commerce Commission. A summary of the testimony presented to the House interstate and foreign commerce committee during its consideration of the measure appeared in *Railway Age* last fall, particularly in the issues of October 13, 20 and 27.

Road Liable to Dependent Next of Kin, However Remote

The Supreme Court of the United States has held that, under the Federal Employers' Liability Act, a railroad's liability, in the case of an employee's death where the nearest survivor comes within the class designated in the statute as "the next of kin dependent upon such employee," runs to the nearest surviving relative dependent upon him, and not exclusively to the hereditary next of kin. The majority opinion was by Justice Douglas, with Justices Frankfurter and Burton dissenting; Justice Jackson took no part in the proceedings.

The question came before the court in *Poff* vs. *Pennsylvania Railroad,* the district court having ruled that the road was liable to a cousin of the employee who was wholly dependent upon him, while the circuit court of appeals had held that this decision was in error because there were nearer relatives, though not dependent ones, surviving. To adopt the appellate court's view, said Justice Douglas, would be to treat the nearer next of kin who are not dependent as a preferred class, not for

their benefit but to defeat recovery of damages by all next of kin. This, he observed, would be a "radical departure from the statutory scheme." Congress has made no such provision as between those classes of survivors designated in the act, and nothing in the language of the statute compels adoption of a "more stringent interpretation" when determining what members within one class may sue.

It was the view of the dissenting justices that "next of kin" is a term of precise meaning in the law, and was used designedly by Congress, in order that the relatives eligible for compensation might be limited and the basis of eligibility strictly designated. Dependency, said Justice Frankfurter, quoting the lower court, is only a selective factor, a condition upon recovery by any members of the "next of kin" class, and "next of kin" remains defined by the hereditary, rather than the pecuniary relationship.

Col. Lasher Returns as Chief, Commercial Traffic Service

Col. E. C. R. Lasher has returned to the Office of Chief of Transportation at Washington, D. C., as chief, Commercial Traffic Service (formerly Traffic Control Division), the War Department has disclosed. The transfer became effective March 4.

Col. Lasher, who recently was stationed at New York as zone transportation officer for the second transportation zone, at one time was in charge of the Commercial Traffic Branch under the Quartermaster General, which served as the traffic management office of the War Department prior to the organization of the Traffic Control Division under Brig. Gen. William J. Williamson.

Brig. Gen. Paul F. Yount, whom Col. Lasher replaces as chief of the Commercial Traffic Service, has succeeded Col. Luke Finlay as executive to the Chief of Transportation. Gen. Yount, who also server as chief of the Military Railway Service, has turned over that office to Lt. Col. Richard B. Baldwin as acting chief.

Plan to Streamline Procedures of Congress Presented

Among a large number of recommendations for changes in the procedures and organization of Congress to secure greater efficiency and order in its activities which have been suggested in a report by a special joint committee of the Senate and House are proposals to consolidate the 33 standing committees of the Senate into 16, and to reduce the 48 standing committees of the House to 18.

Under this plan, each Senator would be limited to membership on two committees and each House member to one. The plan contemplates no change in the responsibilities or jurisdiction of the House committee on interstate and foreign commerce, but it provides for a consolidation of the existing Senate interstate commerce and manufactures committees, the latter being absorbed by the former. The plan also includes a recommendation that the rules be revised to define clearly the jurisdiction of each committee so that conflicts and duplication may be avoided. Such committees would be given the power of subpena and the responsibility of continuing review and oversight of the government agencies administering laws originally reported by them.

The plan goes on to outline suggested modifications of committee procedure, among which is a recommendation that committee chairmen be required to report promptly all bills approved by their respective committees, that committees be authorized to employ permanent staffs of "experts" in the field of their responsibility to advise members, and that hearing procedure be modified to require witnesses to present statements of their testimony in advance, so that oral statements may be condensed, at the same time making it possible for the committee staff to digest written statements and "brief" committee members on their content and on pertinent questions.

In addition to these and other proposed modifications of committee procedure and organization, the report goes at some length into ways and means whereby the special committee believes legislative processes can be expedited, the time of members and of the public conserved, and the physical facilities of the Capitol better adapted to the needs of Congress and the public. The report was prepared by a joint committee on the organization of Congress, created under House Concurrent Resolution 18, which consists of 6 members of the Senate and 6 of the House, the chairman being Senator LaFollette, Wisconsin Progressive.

Railroads Call Commodity Rate Investigation Premature

Railways in Official territory and the National Industrial Traffic League, among others, have advised the Interstate Commerce Commission of their objections to the proposal of the American Trucking Associations and other truck operators' organizations that the commission institute an investigation of rail, truck and forwarder l.c.l. and any-quantity exceptions ratings and commodity rates, the substance of which was reported in *Railway Age* of February 9, page 335.

Such an investigation, the railroads pointed out, would be premature while litigation is in progress to determine the propriety of the commission's decision last year in the general class rate case, in which a court order halting the application of the prescribed rate adjustments is now effective. The proposed investigation would be out of order at this time, also, the carriers added, because of the prospect that increases in costs of materials and in wage rates will make it necessary before the end of the year to apply for approval of a "substantial" general increase in freight rates.

Truck-for-Rail Arrangement for M. P. L. c. l. Service

Division 5 of the Interstate Commerce Commission has authorized the Columbia Motor Transport Company, of St. Louis, Mo., to operate under contract with the Missouri Pacific as a common carrier by motor vehicle of general commodities in substituted motor-for-rail service between certain points in Arkansas, Louisiana, Missouri and Tennessee. The routes are specified to reach intermediate and off-route points which are stations on the Missouri Pacific, which supported the application. Commissioner Patterson did not participate in the disposition of the proceeding.

Under the findings of the division, the service to be performed must be limited to that which is auxiliary to or supplemental of the rail service of the M. P. The carrier will not serve any point not a station on a rail line of the road and shipments must be limited to less-than-carload shipments which move under railroad bills of lading.

The applicant is a wholly-owned subsidiary of the Columbia Terminals Company, but neither is affiliated with the Missouri Pacific.

January Accident Statistics

The Interstate Commerce Commission on March 12 made public its Bureau of Transport Economics and Statistics' preliminary summary of steam railway accidents for January, 1946. Statistics covering the comparable period for 1945 also are listed. The compilation, which is subject to revision, follows:

Item	Month of January 1946	1945
Number of train accidents*	1,420	1,643
Number of casualties in train, train-service and nontrain accidents::		
Trespassers:		
Killed	114	81
Injured	61	89
Passengers on trains:		
(a) In train accidents*		
Killed	3	..
Injured	173	70
(b) In train-service accidents:		
Killed	5	5
Injured	238	234
Travelers not on trains:		
Killed	4	..
Injured	121	132
Employees on duty:		
Killed	65	94
Injured	3,925	4,265
All other nontrespassers:**		
Killed	218	194
Injured	796	900
Total—All classes of persons:		
Killed	409	374
Injured	5,314	5,690

* Train accidents (mostly collisions and derailments) are distinguished from train-service accidents by the fact that the former cause damage of more than $150 to railway property.

** Casualties to "Other nontrespassers" happen chiefly at highway grade crossings. Total highway grade-crossing casualties *for all classes of persons, including both trespassers and nontrespassers,* were as follows:

Persons:		
Killed	219	178
Injured	518	578

Lea Investigation Approved

The House on March 7 adopted House Resolution 318, specifically authorizing its committee on interstate and foreign commerce "to investigate the transportation situation with a view to recommending legislation that will result in a consistent public policy fair to all competing agencies of transport, to the using and investing public, and to labor, to the end that the country's commerce may be moved with the greatest possible degree of economy, safety, and dispatch."

Inasmuch as the committee already has solicited and received written expressions of opinion from many interested parties, based more or less on a list of topics suggested for discussion, its procedure under the broadened authority of this resolution is expected to take the form of an analysis and evaluation of these statements rather

than of extended hearings. To facilitate this appraisal of the views submitted to it, the committee has been authorized to employ a special staff, and to utilize the facilities and services of government agencies. No special allocation of funds is provided, that matter being left for later action.

Under the terms of the resolution, the committee may make preliminary reports at its discretion, and it is directed to make its full report of the results of its investigations, with recommendations for legislation, during the present Congress.

Equipment Depreciation Rates

Equipment depreciation rates for the Chicago, Milwaukee, St. Paul & Pacific and the Southern are among those prescribed by the Interstate Commerce Commission in a new series of sub-orders in the general proceeding, Depreciation Rates for Equipment of Steam Railroad Companies. The total ledger value of all equipment of the two roads named is given, respectively, as $179,526,703 (also $5,435,932 leased) and $121,915,740.

For the Milwaukee the depreciation rates prescribed in sub-order 734—the initial sub-order for the reorganized company—are: Steam locomotives owned, 3.21 per cent, leased 3.31 per cent; other locomotives, 3.69 per cent; freight train cars owned, 3.5 per cent, leased, 3.8 per cent; passenger train cars, 3.28 per cent; floating equipment, 3.17 per cent; work equipment owned, 4.63 per cent, leased, 4.61 per cent; and miscellaneous equipment owned, 14.69 percent.

For the Southern the rates prescribed in sub-order 158-C are: Steam locomotives, 2.91 per cent; Diesel-electric road locomotives, 6.6 per cent; Diesel switch locomotives, 3.96 per cent; freight train cars, 3.84 per cent; lightweight streamlined passenger train cars, 3.9 per cent; Diesel-motored passenger train cars (including trailer), 4.5 per cent; other passenger train cars, 2.8 per cent; floating equipment, 2.75 per cent; work equipment, 3.85 per cent; and miscellaneous equipment, 8.04 per cent.

Representation of Employees

The American Train Dispatchers Association has been authorized to represent chief train dispatchers employed by the Chicago, Rock Island & Pacific, according to the results of a recent election which has been certified by the National Mediation Board. Prior to the election, only night chief, trick, relief and extra train dispatchers were represented by the association, while the chief dispatchers were not represented by any organization.

In other recent elections, the Brotherhood of Railroad Trainmen was chosen to represent yardmasters of the Chicago, Indianapolis & Louisville, formerly represented by the Order of Railway Conductors, and the Brotherhood of Railroad Signalmen has been authorized to represent signal inspectors as well as other signal department employees of the Southern Pacific, Pacific Lines. Inspectors formerly were not represented by any organization.

Patrolmen in the Police Department of the Northern Pacific are now represented by the American Brotherhood of Railway Police, as the result of an election which the National Council of Railway Patrolmen's Unions, A. F. of L., lost 39 to 25. Road brakemen employed by the Detroit & Toledo Shore Line, formerly represented by the Brotherhood of Railroad Trainmen, have selected the Order of Railway Conductors as their representative.

An application to the board from the Brotherhood of Railroad Trainmen to determine the representative of road conductors employed by the New York, Ontario & Western was withdrawn. These employees have been represented by the Order of Railway Conductors.

The American Train Dispatchers Association has supplanted the Order of Railroad Telegraphers as Railway Labor Act representative of train dispatchers employed by the Alaska Railroad, according to results of a recent election which has been certified by the National Mediation Board. Another recent N. M. B. certification named the Brotherhood of Railroad Trainmen as representative of New York, Onario & Western yardmasters.

O. P. A. Announces Ceiling Price Increase on Specialties

An industry-wide increase of four per cent in ceiling prices for all railroad specialties and steel castings was announced March 12 by the Office of Price Administration. The increase, which became effective that date, is the first pricing action since the basic steel price increase (reported in *Railway Age* of March 9, page 525), to compensate an industry for the "unabsorbable portion of an increase in wages under the new government wage-price policy," according to the O. P. A. The increase is calculated by that agency, it said, to restore earnings for the industry as a whole for the next year to the average levels of the 1936-1939 period.

The announcement explained that this increase boosts prices a total of 15.5 per cent, compared with VJ-Day levels. Last November 30, the railroad specialties and steel castings industry was given an 11 per cent increase in ceiling prices "to remove impediments to full production of peacetime castings."

"The bulk of the steel castings industry has made wage increases up to 18½ cents an hour which have received approval of the National Wage Stabilization Board," the O. P. A. said, "and after taking the entire amount of the wage increase into consideration, the price agency has found that the industry's current ceiling prices, including the increase authorized last November, will leave it in an earnings position requiring adjustment."

The increase is applicable to such railroad specialties as car side frames, bolsters, yokes and couplers, but will not be applied to the prices of a company which has been granted an individual price adjustment if the individual adjustment was more than 15.5 per cent.

The O. P. A. Machinery Price Branch also disclosed this week that surveys are now under way in capital goods industries, including the rail equipment field, the results of which will be used as a basis of adjusting ceiling prices, "when required," to reflect increased raw material costs and "approved" wage increases. Railroad commodities affected by the survey include machine tools, frogs and switches, lead storage batteries, car and locomotive axles, forged and steel wheels, forgings and brake beams.

According to Arthur H. Moran, price executive of the Machinery Branch, individual price adjustment applications from companies in a surveyed industry who justify the need for additional price relief over and above that granted the industry, will be taken care of after the O. P. A. announces the results of its surveys.

Western Truckers Want Extra Charge for P. & D. Service

The Middlewest Motor Freight Bureau, the Pacific Inland Tariff Bureau, and the Southwestern Freight Bureau have submitted a petition to the Interstate Commerce Commission asking it to issue a rule to show cause why rail, truck, or forwarder rates covering transportation in which pick-up and delivery service is performed without separate charge, including situations where that service is performed through contract arrangements with cartage companies, and effective from, to, or between points west of the Mississippi river, should not be increased by an amount equal to the charge made by drayage companies or other contractors for the performance of pickup and delivery service.

1945 Fiscal Report of Mediation Board

(*Continued from page 584*)

more complete representation is established among the various air line employee groups."

Adjustment Board—The section of the report devoted to National Railroad Adjustment Board activities revealed that referees were appointed during the fiscal year for 846 deadlocked cases, as compared with 640 during fiscal 1944. The adjustment board's First division again preserved unblemished its record of being unable to select a single referee during the year to sit with it in the consideration of deadlocked cases, the report observed, making it necessary for the National Mediation Board to appoint all such referees. The Second division selected referees in all its deadlocked cases, while the Third division was successful in doing so in 80 per cent, and the Fourth division in 60 per cent, of such cases.

The largest compensations received by individuals during the year for services as referee were $4,612.50 by Curtis G. Shake for 92¼ days with the Third division and $4,325 by Albert Anderson for 86½ days with the First division, the regular per diem rate being $50.

Car Service Orders

The Interstate Commerce Commission has prohibited the movement of box cars loaded with imported seed oats in bulk, effective March 15 through May 20, unless otherwise directed, under the terms of Service Order No. 463. The order was issued,

it was indicated, to avoid delay affecting the box car supply which has occurred at the Canadian border in connection with sampling and grading such shipments.

The life of a number of service orders scheduled to expire March 15 has been extended by appropriate amendments. Those affected are No. 438, which limits free time on box cars loaded with import freight at ports; No. 422, which requires railroads to unload cars held 10 days at ports or freight houses; No. 112, which limits free time allowed at destination on fresh or green fruits or vegetables; and No. 369, which prescribes demurrage charges on box cars. The expiration date of the two orders first mentioned has been changed to October 15, and that of the latter two to September 15.

The prohibition against supplying box cars for the bulk shipment of carbon black for export, made effective under Service Order No. 462, as noted in *Railway Age* of March 9, page 524, has been modified in a revised version of that order, effective March 21 through July 21, unless otherwise directed, permitting the use of box cars for such shipments upon shipper's certification on the car order that the carbon black is packaged in containers suitable for loading on vessels, so that repackaging at ports will not be required.

Chairman W. C. Kendall of the Car Service Division of the Association of American Railroads has notified railroads of a modification of instructions governing the placing and handling of embargoes to make it clear that embargoes should be made effective upon receipt, both as to loading of cars and as to acceptance of orders for diversion or reconsignment of cars to an embargoed destination.

Consolidating Cases Held Sound Practice

(*Continued from page 583*)

as if they were one, assertedly using evidence presented in one case to support its conclusions in the other, and to its failure to give some indication to the parties that both applications might be granted, so that defenses to the institution of two competing operations might be offered.

In other words, the opinion continued, the district court had taken the position that the commission had injected a "new issue" into both proceedings not previously taken into consideration by the parties, namely, the possibility that both applications might be granted. On this point the conclusion of the Supreme Court was that "the issue concerning whether both applications should be granted was injected, not by the commission's report or any other action taken by it, but by the filing of the applications in the first place." Once the applications were under consideration, it was pointed out, the possibilities were "that both applications might be denied, that one might be granted and the other denied, or that both might be granted. . . . If appellees misconceived the nature of the proceedings in this respect, as we do not think was the case, they were not misled into doing so by any action of the commission."

Upholds Joint Handling—The court was equally unimpressed by the argument that the commission should have considered each case exclusively on its record, rather than looking to the evidence in both to form its conclusion. If this procedure had resulted in substantial prejudice to one of the parties, it might be held objectionable, but the appellees did not succeed in showing such prejudice, Justice Rutledge remarked. "In the absence of any showing of specific prejudice, the claim comes down to the highly technical objection that the commission, in the final stage of forming its judgment, could not in either case take account of what had been done in the other, notwithstanding the closely related character and objects of the applications and the prior proceedings." This contention he found untenable, commenting that "it amounts to a legal version of the scriptural injunction against letting one's right hand know what one's left hand may be doing. Obviously it would be consistent neither with good sense nor, we think, with the type of hearing assured by the statute to force the commission to put on such complete blinders."

Other conclusions of the lower court to the effect that the commission's findings of convenience and necessity were not properly based, as required by law, on appropriate evidence of the fitness, willingness and ability of the applicants to perform the service involved, the Supreme Court did not agree with, its view being that there was a sufficient finding, "though inartistically drawn," and that it was properly based on evidence.

The district court, said Justice Rutledge in conclusion, misconstrued not only the effects of the commission's action but also its own function. It is not true, he observed, that the courts must in a litigated case be the arbiters of the paramount public interest, as the lower court said. "This," he added, "is rather the business of the commission, made such by the very terms of the statute. The function of the reviewing court is much more restricted. It is limited to ascertaining whether there is warrant in law and the facts for what the commission has done. . . . . It cannot substitute its own view concerning what should be done, whether with reference to competitive considerations or others, for the commission's judgment upon matters committed to its determination, if that has support in the record and the applicable law."

The *per curiam* finding in the Akin case was an affirmation of a lower court judgment upholding a decision of the commission denying an application for a convenience and necessity certificate claimed on the basis of alleged grandfather rights. Its action, the court held, was supported by substantial evidence that the applicant was not, on the grandfather date, engaged in bona fide common carrier operations.

Senate Committee Gets Report on Unions' Benefits Bill

Following the procedure which its chairman, Senator Johnson, Democrat of Colorado, had indicated it would adopt, the Senate interstate commerce subcommittee which has had under consideration S.293, the Senate version of proposed legislation embodying the program of the Railway Labor Executives Association for "liberalizing" the Railroad Retirement and Railroad Unemployment Insurance Acts, has made a factual report to the full committee, analyzing the measure in some detail, without offering any recommendation as to action to be taken on it.

A companion bill, H.R.1362, introduced by Representative Crosser, Democrat of Ohio, remains under the consideration of the House interstate and foreign commerce committee after extensive hearings ending April 26, 1945, which were reported currently in these columns. The Senate bill was introduced by Senators Wheeler of Montana and Wagner of New York, Democrats, the former being chairman of the committee to which it was referred for appropriate action.

The subcommittee concluded, its report indicated, that "the questions of policy needing decision are of such great importance that the full committee will find, after study and deliberation, that it will of necessity have to make the decisions itself." It went on to commend to the attention of the committee "a comprehensive and important report dealing with the over-all issues relating to national social security" which had been prepared for the use of the House ways and means committee ,in which, as noted in *Railway Age* of February 9, page 333, the advantages of consolidating the special railroad "social security" system into the general federal program were strongly urged.

The language of the subcommittee report followed very closely that of the memorandum to it of Stephen E. Rice of the Senate's Office of Legislative Counsel, analyzing the bill, the principal features of which were reported in *Railway Age* of January 12, page 164.

Reorganization Bill Hearings Are Concluded

The Interstate Commerce Commission does not favor enactment of the modified version of the bill to revise the machinery for reorganization of railroads on which the Senate interstate commerce committee has held hearings recently, as noted in the February 23 and March 2 and 9 issues of *Railway Age*, according to a statement to the committee by Commissioner Mahaffie. The original bill (S.1253) was introduced by Senator Wheeler, Democrat of Montana and chairman of the committee, at the commission's request, but the suggested amendment to make its provisions applicable also to roads already in process of reorganization was offered later.

The commission particularly deplored the proposal, contained in the amendment to the bill, that roads in reorganization be returned to the control of the equity holders pending debt adjustment negotiations between the owners and the creditors, it was indicated. If the committee felt that injustice had been done or might be done any parties in any of the reorganization plans formulated by the commission under the provisions of section 77 of the Bankruptcy act, the commissioner observed, an appropriate remedy would be an amendment to section 77 to require the commission to give further consideration to such plans, in the light of changed economic conditions.

There were both legal and mechanical difficulties of great magnitude that would

be encountered under the procedure provided in the modified bill, Mr. Mahaffie suggested, and he feared that further delay might result in the conclusion of reorganizations on which much effort and time had been expended. It would be more expeditious, he indicated, to have the commission consider whether or not a given road's position had changed sufficiently since its reorganization plan was approved to justify increasing the amount of securities that might be issued under the plan and so to afford junior creditors and equity holders greater relief.

Commissioner Mahaffie's comments were supplemented by those of Commissioner Splawn, who gave the committee data on the amount of interest in default for the principal roads undergoing reorganization, from which he argued that it would be most unfair to remove such properties from the control of neutral trustees, officers of the courts, and return them to the control of the debtor companies, some of which had functioned for years only as litigants, their equities having been found by the commission and the courts to have no value. While the commission would conscientiously undertake to modify reorganization plans in the light of changed conditions, he did not think value could be legislated into stocks if it did not exist in the property.

Commissioner Splawn concluded his statement to the committee with a suggestions that the credit position of all the railroads might be immensely improved, and their ability to make very large expenditures for betterments and new equipment to improve their service and meet competition might be greatly strengthened, if they should issue some $20 billion of new bonds, on which the federal government would guarantee interest payments, using about $8 billion of the proceeds to retire outstanding callable issues and the other $12 billion for improvements to their properties. Annual interest requirements would not be very much greater on such new securities than the charges on the issues that would be retired, according to the commissioner's figures, and he saw possibilities in such a transaction for the railroads to enlarge their earning power and so to add value to their properties for the benefit of their owners. There is no advantage to devising rules to distribute capitalization, he declared, as value is what must be distributed.

In contrast to these statements by members of the commission were the views of Robert W. Purcell, vice-president and general counsel of the Chesapeake & Ohio and the New York, Chicago & St. Louis, who was one of the last witnesses heard by the committee. He approved the extension to roads already in reorganization of the procedures for debt adjustment set forth in the bill, taking the position that proceedings would be expedited when the responsibility for their success rested on the owners rather than on neutral government agencies or trustees who generally had no incentive to wind up the cases and terminate their jobs.

The relative speed with which the reorganization of the Erie was consummated, as compared to others no more complicated, he suggested, could be attributed to the participation therein of equity holders. Where they have been frozen out of the proceedings and have nothing more to lose, stockholders naturally resort to every means of litigation in search of relief, he pointed out, no matter how much the reorganization may be delayed. Mr. Purcell was not impressed with the proposal that approved reorganization plans be returned to the commission for further consideration in the light of changed conditions, as he believed, first, that the commission would continue to be most conservative in appraising the situation, and second, that the cumbersome procedures of section 77 would have to be repeated if the commission did substantially revise a plan, thus bringing further prolonged delays.

Car Lines Report for 1944

Private car lines reporting to the Interstate Commerce Commission for the year ended December 31, 1944, had for that year total operating revenues of $207,579,047, of which $196,399,578 was reported by the 29 companies owning 1,000 or more cars. The year's operating expenses totaled $148,017,810, of which the 29 large operators reported $138,977,176.

These and other data compiled from annual reports of 105 private car line operators are shown in a compilation of selected statistics prepared by the Bureau of Transport Economics and Statistics of the Interstate Commerce Commission. The compilation for the calendar year 1944, recently made available, appears in Statement No. 462, and is the third of its kind. The annual summary of such statistics covering the year 1942 was reviewed in *Railway Age* of January 13, 1945, page 162.

The total revenue figure for 1944 is made up of the following items: Car service (mileage allowances and rents), $174,538,845; refrigerator service, $30,680,266; heater service, $894,037; other service, $725,470; and incidental revenue, $740,429. With the exception of car service, there was a marked increase over the corresponding 1943 figure in each of the foregoing categories.

The net investment in transportation property of the reporting lines at the end of 1944 was $193,248,694, as compared with the 1943 net of $209,766,405. The 1944 figure was arrived at by deducting a $409,793,578 reserve for depreciation from a book investment total of $603,042,272.

The book value of property investments in 1944 consisted of $321,599,362 in 110,608 refrigerator cars; $234,759,703 in 123,040 petroleum tank cars $23,960,193 in 8,105 other tank cars; $5,700,856 in 4,456 stock cars and $17,022,158 in 9,508 other cars. Of the 255,717 cars accounted for, 22,529 were owned by operators possessing 100 but fewer than 1,000 cars and 233,188 by owners of 1,000 cars or more.

According to the I. C. C., operators owning more than 1,000 cars constituted 27.6 per cent of the number of those filing annual reports, but they owned 91.2 per cent of the cars. Owners of fewer than 100 cars are not required to file annual reports, but the statement observes that their exclusion from the annual reporting "does not significantly affect the statistics."

As in 1943, the largest private car operator in 1944, on the basis of investment and number of cars owned, was the General American Transportation Company. This operator reported 55,229 cars owned at the end of the year, as compared to 55,855 in 1943. Its net investment in transportation property at the close of 1944 was $49,687,155; its gross operating revenues for the year, $41,185,433, and its total operating expenses, $32,300,564. In 1942 and 1943 this operator also reported the largest operating revenue, but the Pacific Fruit Express Company assumed first place in this respect in 1944, reporting $42,115,971.

While General American was the largest single operator, the largest refrigerator car operator was Pacific Fruit Express, which reported 33,494 such cars, as compared with 33,622 in 1943. General American and Fruit Growers Express Company each reported 15,035 refrigerator cars. The largest single operator of petroleum tank cars was Union Tank Car Company, with 38,608. General American reported 37,316 of this type.

Pacific Fruit Express again was second to General American in total operating expenses, reporting $28,549,423. Other large operators on the gross revenue basis were Union Tank Car, reporting $26,617,017, and Fruit Growers Express, reporting $22,356,180.

Soft Coal Controls Removed

Lifting of certain government controls over the domestic distribution of bituminous coal to take effect April 1 has been announced by Acting Solid Fuels Administrator Oscar L. Chapman. Regulations controlling coal for export remain in force.

Control over distribution of soft coal was modified on December 1, 1945, after the close of the navigation season on the Great Lakes, and all preferences in its distribution have now been revoked, effective April 1. The same holds true of limitations on stockpiling, and responsibility for an equitable distribution reverts to the industry itself, Mr. Chapman said. Reporting requirements, however, will be retained throughout April in modified form.

Materials and Prices

The following is a digest of orders, notices and information that have been issued by the Department of Commerce and the Office of Price Administration, since February 14 and which are of interest of railways:

Industrial Reports—The fourth issue of the "Bibliography of Scientific and Industrial Reports distributed by the Office of the Publication Board," containing abstracts of 473 reports, was placed on sale by the Superintendent of Documents, Government Printing Office, on February 15, priced at 20 cents.

Comprising 45 pages of abstracts, the issue contains listings under the following subject headings: Transportation equipment, with 57 titles, covering German and U. S. developments; chemicals and allied products, with 95 titles; electrical machinery, equipment, and supplies, with 169 titles, covering German, Italian, Japanese, and U. S. developments; fabricated metal products (except ordnance, machinery, and transportation equipment), with 10 titles; lumber and wood products (except furniture), with 2 titles; machinery (except electrical), with 46 titles, covering German and Italian developments; ordnance and accessories, with 17 titles; covering German

and U. S. developments; primary metal industries, with 11 titles; products of petroleum and coal, with 19 titles, covering German and U. S. developments; professional, scientific, and controlling instruments, with 7 titles; miscellaneous, with 32 titles.

The reports describe in the listings contain information on scientific and technical developments, processes, products, inventions, and related matters of potential interest to American science and industry. This information previously was subject to security restrictions but has now been released for distribution by O. P. B.

Copper—Allowable inventories of all types of copper products have been further restricted by C. P. A. because of shortages. The 45-day inventory limitation on iron and steel products will also be continued, because of continued shortage. New restrictions on copper products are imposed through a revision of priorities regulation No. 32.

Prices

Basic Steel Prices—The O. P. A. announced price increases ranging from $2 to $12 a ton for all basic steel products on March 1.

The agency said that the new price schedule met terms of the government's Feb. 15 directive which authorized an average price rise of $5 a ton for total output of basic carbon and alloy steel products.

The higher prices, retroactive to Feb. 15, under provisions of the original directive, are being granted to offset a wage increase of 18½ cents an hour in the steel industry.

O. P. A. said that the price adjustments meant an increase of 8.2 per cent in the average price of all steel. The new average price of all steel, both carbon and alloy, is $65.92 a ton, as compared with $60.92 hitherto.

O. P. A. said that the degree of absorption of higher steel costs that would be required of producers and distributors of consumer goods, machinery and building materials was being worked out, and would be announced later.

Steel warehouses and jobbers were authorized to pass on to customers immediately the amount of the increases. Additional pricing actions will be taken "as may be required for fabricated products, such as steel drums, bolts, nuts, crews and rivets, and concrete reinforcing bars."

The agency added that these additional actions will provide industry-wide ceiling price adjustments if they are required "to relieve financial hardship occasioned by increased costs of the raw steel fabricators use, and also any wage increases which are approved by the Wage Stabilization Board."

O. P. A. said it had endeavored, as directed by former Stabilization Director Collet, to:

1. Encourage maximum production of items in greatest demand.
2. Establish a price structure adapted to the needs of the transition and postwar periods.
3. Minimize the impact of the increase on prices of consumer goods.
4. Remove or minimize hardships to smaller and nonintegrated producers.

Mill ceiling price increases are applicable to sales of both prime and secondary quality products. The following increases are in cents per 100 lb. unless otherwise noted:

Carbon steel products—ingots and sheet bars, all types and qualities, $2 a gross ton; blooms, billets, slabs and tube rounds of all qualities except forging, $3 a gross ton.

Forging, billets and blooms, $5 a gross ton.

Structural shapes and piling, 25 cents.

Plates, all types and qualities, 25 cents.

Rails, all types and grades except light rails, $5 a net ton.

Light rails, all types and grades, $9 a net ton.

Splice bars, all types and grades, 15 cents.

Tie plates, all types and grades, 25 cents.

Hot rolled merchant bars and bar-sized shapes, all types and grades, 25 cents.

Concrete reinforcing bars, all types and grades, 20 cents.

Hot rolled wire rods, all types and grades, 15 cents.

Manufacturers' wire and merchant quality wire, all types and finishes except such wire as is suspended from price control under Amendment 6 of supplementary order No. 129, 30 cents.

Nails and staples, all types and finishes, 35 cents.

Twisted barbless and barbed wire, 35 cents.

Wire fencing, including woven, chain link and law, 25 cents.

Fence posts, all types and accessories, 25 cents.

Tin plate, including hot dipped, electrolytic and can-making quality black plate, 25 cents a base box. For all such materials sold on a 100 lb. basis, 25 cents a 100 lb. may be added.

Tern plate, 25 cents.

Long terne sheets, 25 cents.

Hot rolled iron and steel sheets, 22½ cents.

Cold rolled sheets, 22½ cents.

Galvanized sheets, 35 cents.

Enameling sheets, 35 cents.

Electrical sheets, electrical armature and field grades, 60 cents.

Electrical sheets, all other grades, 37½ cents.

Hot rolled strip, 6 in. and narrower, 35 cents.

Hot rolled strip, wider than 6 in., 25 cents.

Cold rolled strip, 25 cents.

Track spikes, 40 cents.

Cold finished bars, 35 cents.

Certain other carbon and alloy steel products—pipe and oil country tubular goods; buttweld and lapweld, $6 a net ton.

Electric weld and seamless, $5 a net ton.

All alloy steel products except stainless, the seller may increase the applicable maximum price (base price plus extras) by 4 per cent.

Tool steel and specialty steels, both carbon and alloy produced by tool steel producers, 8.2 per cent.

All carbon and alloy steel tubing, other than oil country tubular goods and carbon steel pipe, an increase of 6.6 per cent on hot finished products, on cold finished products 9.9 per cent and on applicable maximum extras and on applicable maximum extras and other charges, 8.2 per cent.

Steel screen wire cloth, 8.2 per cent.

Carbon steel products such as poultry netting, hardware cloth and wrought iron, exclusive of new products priced by special order and for which industry-wide prices have not yet been established, such as 18-in. by 14-in. mesh, 11 gage, 8.2 per cent.

Calking Compounds—Manufacturers whose production of putty and of calking compounds constituted at least 90 per cent of their total business in 1945 have been granted an increase of 15 per cent in ceiling prices in O. P. A. amendment No. 93 to order No. A-1 under regulation No. 188, effective March 6.

Ceramic Tile—Reconverting manufacturers of ceramic floor and wall tile are given a profit factor by O. P. A. for use in calculating reconversion prices in amendement No. 13 to supplementary order No. 118 and amendment No. 2 to supplementary order No. 119, both effective March 12.

Clay Pipe—An increase of 6.5 per cent over March, 1942, levels on manufacturers' sales of vitrified clay sewer pipe and allied products produced in northern California has been authorized by O. P. A. in amendment No. 18 to revised regulation No. 206, effective March 6.

Drain Tile—To restore shipment of Ohio clay drain tile to Virginia and 26 northwestern counties of New York, O. P. A. raised delivered ceilings of the construction material an average of $1.10 a ton in the affected area. Amendment No. 29 to order No. 1 under section No. 25 of regulation No. 592 is effective at once.

Hard Rubber Products—Price relief recently granted manufacturers of molded, extruded, lathecut and chemically blown sponge rubber products except when made of hard rubber has been extended by O. P. A. to manufacturers of the same products made of hard rubber in amendment No. 24 to regulation No. 149, effective March 6.

Hardwood and Softwood Lumber — The O. P. A. regulation governing services of custom-milling and kiln-drying of northeastern softwood lumber is extended to include hardwood and all softwood species except western softwoods, in revised regulation No. 539-A, effective March 11.

Paints—Provision is made by O. P. A. so that individual manufacturers of trade sales paints may apply for adjustments in their ceiling prices under amendment No. 37 to order No. A-2 under regulation No. 188, effective March 13.

Rubber Bands—Dollar-and-cent ceilings already established for buna-s synthetic rubber bands will also apply to natural rubber bands as well as to bands made from a combination of natural and buna-s rubber, O. P. A. directed in amendment No. 25 to regulation No. 220, effective March 6.

Softwood Lumber — An increase of $1.75 a M.f.b.m. in producer's ceiling prices on some species of softwood lumber in Michigan, Wisconsin and Minnesota, and western white spruce imported from Canada, has been authorized by O. P. A. in amendment No. 5 to second revised regulation No. 222, effective March 1.

Steel Bars—Fabricators of concrete reinforcing bars are authorized by O. P. A. to pass on to their customers the dollars-and-cent amount of increase in the basic steel mill prices authorized March 1 for the bars. Amendment No. 1 to revised regulation No. 159 is effective at once.

Tool Handles—Distributors of striking tool handles for axes, mattocks and the like may take the same markup on special patterns, lengths and finishes as is permitted on regular handles, O. P. A. ruled on amendment No. 18 to second revised supplementary regulation No. 14 under the general maximum price regulation, effective March 12.

Wage-Price Formula — Stabilization Director Chester Bowles in a move to smash what he termed "those bottlenecks," on March 10, issued a statement on the new wage-price formula which he declared will clear the way for the greatest flood of goods this nation has ever seen.

He declared that the new wage-price policy is a practical step toward sustained prosperity and that "we can make the plan work to get the all-out production needed eventually to lick inflation." Continuing, he said successful operation of the plan means "a good deal of give and take and perhaps a little sacrifice."

The Office of Economic Stabilization issued a new regulation covering the policy, supplemented by a 26-page explanation. Neither statement makes any basic change in the policy first enunciated by President Truman on February 14, that wage increases generally must be approved by the government if they are to be used as bases for price increases. The O. E. S. pointed out that increased prices, particularly for metal consumer products are in prospect.

The new regulation contains a further relaxation. It states that an employer need not obtain prior approval of a wage or salary increase "if he has no present intention of using it as a basis" for a price increase.

If he states this in writing to the Wage Stabilization Board, within 30 days after the pay rise, and then decides later he wants to ask for a price increase, he may apply for both approval and—provided he gets it—a price adjustment.

The stabilization office stressed that under no circumstances will the O. P. A. make any commitments on prices in advance of a wage agreement.

"If O. P. A. gave advance opinions to employers," the statement said, "it would quickly find itself a third party—and in the middle—in almost every wage bargain in the nation."

O. P. A., the government announced, is developing "a number of shortcuts" which it expects to speed up processing of price applications. These include:

1. Use of available cost information for an industry in preference to a new accounting survey.
2. Where a new survey can't be avoided, O. P. A. will use a "streamlined" spot check form and request answers by telegram.
3. Where complexity or major importance of an industry makes a more extended study necessary, a "rough cut interim action may be taken on a conservative basis" to provide immediate relief.
4. In less important situations, automatic pricing by individual firms will be permitted.

Equipment and Supplies

FREIGHT CARS

The Pittsburgh & West Virginia is inquiring for 200 70-ton gondola cars.

PASSENGER CARS

The Erie has ordered seven lightweight sleeping cars from the Pullman-Standard Car Manufacturing Company. The new cars, which will be of the 6-bedroom, 10-roomette type, are to be used on passenger trains operating between Jersey City, N. J., and Chicago. Delivery is expected in the

first quarter of 1947. The inquiry for this equipment was reported in the *Railway Age* of February 9.

SIGNALING

The GREAT NORTHERN has ordered materials from the General Railway Signal Company for the installation of absolute permissive block signaling between Fargo, N. D., and Surrey, a distance of 278 miles. Type D signals, Type K and W relays and Model 7 switch circuit controllers are being used in this installation.

The UNION PACIFIC has ordered materials from the General Railway Signal Company for the enlargement of the relay interlocking at Granger, Wyo. Four track lights and four levers will be added for the control of two switch machines and six signals at ends of a passing siding. Type K relays, Type SA signals and a Model 5D switch machine are included in the order.

Supply Trade

American Locomotive Reports $82 Million Locomotive Backlog

Unfilled orders of the American Locomotive Company at December 31, 1945, amounted to approximately $94,000,000 comprised entirely of products for peacetime use, according to the company's annual report issued by D. W. Fraser on March 4. Approximately $82,000,000 of this backlog represents orders for steam or Diesel-electric locomotives and parts. The steam locomotives are principally for export; the largest single order being for delivery to France.

Commenting on the outlook, Mr. Fraser pointed out that domestic railroads need new and modern locomotives, rolling stock, and parts to replace war-worn equipment and to meet the keen competition of otther forms of transportation. Regarding the export market he said: "Company executives have surveyed first-hand the almost complete devastation of European railroads and equipment. Until foreign facilities for manufacturing locomotives are rehabilitated the United States will be the largest source of locomotive power. Latin-America will also, we expect, look to the United States for power requirements."

Conversion to peacetime production occasioned little loss in American Locomotive's output. Despite cancellation of some $33,000,000 of war orders, shipments for the last half of 1945 declined only 5 per cent from total shipments for the first six months. No further important cancellations are expected.

After provision for the renegotiation of war contracts, net profit for 1945 amounted to $6,551,521—equivalent, after preferred dividend requirements, to $3.09 per share on the average shares of common stock outstanding during the year—or $2.53 per share of common stock outstanding at December 31, 1945. Because of recent changes in the capital structure, no portion of 1945 earnings is diverted to the preferred stock sinking fund. Provision for war and other contingencies in 1945 was $600,000, compared with $2,500,000 in the preceding year. Regular peacetime products constituted 70 per cent of the company's 1945 output and special war products 30 per cent. This contrasts with 56 per cent regular products and 44 per cent special war products delivered in 1944.

At December 31, 1945, net working capital amounted to $34,073,000 (including $3,818,000 in Canada subject to exchange restrictions). Capital expenditures from current funds totalled $4,600,000 during 1945. Since 1940, the company has rearranged its capital structure, modernized its plant and built up its working capital by $18,000,000 to finance post-war business and for further plant expansion.

Through its election to adjust the amortization of emergency war facilities for tax purposes from a 60-month basis to the shortened period ending September 30, 1945, the company has effected a tax saving of approximately $1,392,000, of which $319,000 has been applied to reduce the 1945 tax provision. The balance applicable to prior years' taxes will be transferred to earnings upon final determination of the tax liabilities for those years.

Manufacturing facilities were further improved and rearranged during 1945. Capital expenditures during the year amounted to approximately $4,600,000. Additional facilities at the Schenectady, N. Y., plant for line production of welded V-type Diesel engines for Diesel-electric road locomotives comprised the major portion of these expenditures. It is expected the Diesel plant will be substantially completed during 1946.

National Malleable & Steel Castings—Annual Report

Although unprofitable operations while customers were reconverting for peacetime business reduced the National Malleable & Steel Castings Co.'s 1945 net profit from operations to $10,640, the company was able to add a total of $1,440,593 to surplus, according to its annual report to the shareholders. The large addition to surplus came about through credits of $533,988 for refund of 1943 and 1944 taxes by reason of unused 1945 excess profits tax credit, and of $895,964 through accelerated amortization of emergency facilities.

Financial position of the company at the year-end, as compared with that of the preceding year, was as follows:

	Dec. 31, 1945	Dec. 31, 1944
Gross sales for year	$34,206,540	$43,049,110
Net profit from year's operations	10,640	702,755
Net working capital	8,727,018	5,972,849
Earned surplus	3,942,586	2,715,680
Dividends paid in year	213,687	356,145
Notes payable to banks	2,000,000	4,900,000

American Brake Shoe Company Annual Report

On March 11, William B. Given, Jr., president of the American Brake Shoe Company, reported to stockholders a $12,500,000 improvement and expansion program which is in addition to $3,200,000 expended on plant and equipment in 1945. Book value of Brake Shoe's plants is $15,415,000. Five of the seven new plants are foundries—a brake shoe plant, one for special iron castings, one producing alloy steel, and two non-ferrous foundries. There will be a new non-metallic processing plant in this country and one in Canada. A laboratory for research in automotive and industrial friction materials is under construction and enlargement of the air compressor plant is also reported.

Brake Shoe net earnings for 1945 were $2,512,969, or $2.51 per common share after preferred dividends, which compares with $2.77 per share reported for 1944. A comparison of the five-year periods, 1936-1940 and 1941-1945, shows that in the earlier period the company's sales averaged just under $25,000,000, as compared to $66,436,000 during the war years. Net profit after taxes, however, remained fairly constant, going from an average of $2,387,000 to $2,906,000.

Mr. Given reported that 90 per cent of the company's shipments were under O.P.A. control, and that in many products prices are below fourth quarter costs. Work stoppages in Brake Shoe plants during 1945 amounted to 92,075 man-days of production, as compared to operations of 2,196,620 man-days. A new product reported is the electrically actuated controller, designed to prevent railroad wheel sliding and resulting flat wheels under heavy braking conditions.

E. D. Haugh, traffic representative of the **Bethlehem Steel Company, Inc.,** at Tulsa, Okla., has been promoted to district traffic manager, with the same headquarters.

H. Vander Schilden has been appointed sales representative in the Chicago district for products of the **Lake Erie Engineering Corporation** of Buffalo, N. Y.

Tom R. King has been appointed manager of western railroad sales in Chicago for the **Hewitt Rubber Corporation** to succeed his father, W. Jerry King, who died February 16.

John May, vice-president in charge of sales of the **American Steel & Wire Co.,** a U. S. Steel subsidiary, has been appointed assistant to the president to aid in general commercial and sales policies. **Harry M. Francis,** assistant vice-president, has been elected vice-president in charge of sales to succeed Mr. May.

A booklet describing a new installation procedure which reduces by 50 per cent the time required to install Dzus Fastener studs has been issued by the **Dzus Fastener Company.** Use of a newly-developed grommet eliminates separate operations for inserting, setting and clinching the grommet formerly required. The new time-saving procedure may be used with practically all types and sizes of Dzus Fasteners. The booklet also contains descriptions of the function of various types of Dzus fasteners and shows many typical applications.

Walter F. Spoerl has been appointed general sales manager of the mechanical goods division of the **United States Rubber Company** to succeed Herman A. Everlien, who died on February 21 after 43 years of service with the company. Mr. Spoerl began his rubber career 38 years ago as a clerk in the company's sales offices in Chicago. He was promoted

through various sales and administrative positions to merchandise manager of the mechanical goods division in 1944, which position he held at the time of his new appointment.

H. M. Knobloch, assistant district sales manager in Cincinnati, Ohio, has been appointed district sales manager in Indianapolis, Ind., for the **Jones & Laughlin Steel Corp. R. G. Scoggins,** a member of the company's Memphis, Tenn., sales office, has been appointed district sales manager in Los Angeles, Calif., to succeed **T. W. Bell,** who has been appointed special sales representative in Los Angeles, and **W. S. Wainright,** a salesman in the wire sales department in Pittsburgh, Pa., has been appointed district sales manager in San Francisco, Calif. **W. L. O'Connell,** resident manager of sales in Indianapolis, Ind., has been appointed resident manager of sales in South Bend, Ind.

Hal Bergstrom has been appointed director of the transportation department of **J. Gordon Lippincott & Co.** of New York. He will be in charge of integrating all design activities in the transport field.

Hal Bergstrom

For the past three years Mr. Bergstrom has been head of transportation design for Raymond Loewy Associates. Previously he had served for nine years as chief designed for Montgomery Ward & Co., Chicago.

Leon J. Wise, whose promotion to assistant to the president of the **Chicago Malleable Castings Company,** with headquarters at Chicago, was reported in the *Railway Age* of January 19, was born at St. Louis, Mo., on December 26, 1901, and received his higher education at Washington University. He began his business career in 1922 as a chemist of the National Malleable & Steel Castings Co., and two years later he went with the Muncie Malleable Foundry Company, in the same capacity, with headquarters at Muncie, Ind. In 1926 Mr. Wise resigned to become a metallurgist of the Terre Haute Malleable & Manufacturing Co., at Terre Haute, Ind., and in 1928 he took a similar position with the Chicago Malleable Castings Company, being promoted to general foreman in 1933. In 1935 Mr. Wise was advanced to assistant sales manager at Chicago, and in 1939 he was promoted to manager of industrial sales and manager of research and development. In 1943 he was advanced to assistant to the executive vice-president, the position he held at the time of his latest appointment. Mr. Wise is also general manager of the Allied Steel Castings Company, a subsidiary of Chicago Malleable.

Clarence B. Bull, transportation sales representative at St. Louis, Mo., for the **Sherwin-Williams Company,** has been appointed general manager of transportation sales to succeed **W. J. Montgomery,** who is on extended leave of absence due to illness.

Kenneth F. Park, sales development manager of the **Caterpillar Tractor Company,** has been promoted to engineering consultant on all matters pertaining to the earth-moving field, a newly-created position. In his new capacity Mr. Park will serve the three sales divisions of the company which cover the entire United States and Canada. Mr. Park's career began in 1909 when he became engaged in surveys and railroad location work in British Columbia. While studying for an engineering degree he worked as a chainman and rodman, and in 1915 he worked on the project of locating the towns of Anchorage and Seward in Alaska. In 1926 he was employed in surveys on western dam construction and highways, and later on field work for reclamation districts involving location and building of levees and irrigation systems. In 1933 Mr. Park went with R. G. LeTourneau, Inc., as chief field engineer, and in January, 1944, he joined Caterpillar and was placed in charge of sales development, the position he held at the time of his new promotion.

OBITUARY

John P. Landreth, president and treasurer of the **Spring Packing Corporation,** Chicago, whose death on February 27 was reported in the *Railway Age* of March 9, was born at Beloit, Wis., on August 11, 1883, and received his higher education at the Missouri Military Academy, Mexico, Mo. He began his business career by working for various public utility companies in Joplin, Mo., Corthage and St. Louis, later going with the Denver & Rio Grande Western at Salida, Colo. In 1904 Mr. Landreth was appointed a salesman of the Garlock Packing Company, with headquarters at Kansas City, Mo., and St. Louis, and four years later he was promoted to Chicago manager, with headquarters in that city. In 1916 he became western sales manager of the Anchor Packing Company at Chicago, and in 1923 he was elected president and treasurer of the Spring Packing Corporation, the position he held at the time of his death.

Construction

SOUTHERN.—This railroad has awarded the following contracts: for the construction of new coal, water and sand facilities at Connelly Springs, N. C., at estimated cost of $30,500, to L. G. Plant, Washington, D. C.; for a new freight depot at Attalla, Ala., at estimated cost of $45,500, to the Brice Building Company, Birmingham, Ala.; and for grading for new yard tracks to serve the General Motors Corporation at Doraville, Ga., at estimated cost of $18,000, to the W. C. Shepherd Company and MacDougald Construction Company, Atlanta, Ga.

Financial

BALTIMORE & OHIO. — *Detroit-Toledo Trackage Rights.*—Division 4 of the Interstate Commerce Commission has further extended to April 12 the effective date of its order authorizing this road to operate passenger trains under a trackage rights agreement over the line of the New York Central from Toledo, Ohio, to Detroit, in lieu of the operation of such trains by the Pere Marquette on its line between the same points. (Previous item in *Railway Age* of December 8, 1945, page 956.)

BEAUMONT, SOUR LAKE & WESTERN.—*Lease Amendment.*—This road has applied to the Interstate Commerce Commission for approval of an amendment to its lease of the properties of the Houston North Shore, to give effect to the commission's depreciation accounting requirements. Both roads are controlled by the Missouri Pacific. The transaction is expected to result in a yearly tax saving of approximately $18,000.

BOSTON & MAINE.—*Refunding Building Mortgage.*—This company has applied to the Interstate Commerce Commission for authority to assume liability for $1,250,000 of 4 per cent first mortgage bonds of the North Station Industrial Building, Inc., at Boston, Mass., covering property leased by it. These bonds, to be issued April 1 and maturing serially over a 15-year period, have been sold to the John Hancock Mutual Life Insurance Company. The proceeds are to be applied to the retirement at par of $1,292,000 of 5 per cent first mortgage bonds of the building company, due in 1962 and now outstanding, which likewise are guaranteed by the Boston & Maine.

CHESAPEAKE & OHIO.—*Awards Equipment Trust.*—On March 7, the C. & O. awarded $1,750,000 of 1⅛ per cent serial equipments to Halsey Stuart & Co. at 99.612, an interest cost basis to the company of 1.198 per cent. The certificates, which will be dated March 15, 1946, and mature in 10 equal annual installments of $175,000 each, are to be issued to finance in part the purchase of 200 70-ton steel covered hopper cars and 500 50-ton steel hopper cars, to cost approximately $2,216,496.

CHESAPEAKE & OHIO-PERE MARQUETTE. —*Merger Plan.*—These two companies and the Alleghany Corporation, which controls the Chesapeake & Ohio through ownership of 7.92 per cent (606,634 shares) of its capital stock, have asked the Interstate Commerce Commission to approve a plan whereby the Pere Marquette is to be merged into the C. & O. The transaction is to be accomplished by exchange of stock on the terms outlined in *Railway Age* of December 8, 1945, page 957, but is still subject to approval of stockholders. The C. & O. would issue 211,429.4 shares of new 3½ per cent convertible preferred stock and an additional 312,272.2 shares of com-

mon to carry out the exchange, and the application includes a request for authority to issue such additional stock, and to assume liability for P. M. obligations outstanding. Annual savings of interest and other charges are expected to approximate $500,000, and a substantial reduction in the par value of outstanding capitalization is provided for. The C. & O. now holds 47.74 per cent (313,900 shares) of P. M. common stock and 13,950 shares of that road's 5 per cent preferred.

DELAWARE & HUDSON.—*Extension of Maturity.*—Division 4 of the Interstate Commerce Commission has authorized the Delaware & Hudson Railroad to extend to 1971 the maturity date of $10,000,000 of Albany & Susquehanna first mortgage 3½ per cent 40-year gold bonds, to bear interest at the rate of 2¾ per cent a year, payable semi-annually. The Delaware & Hudson Company has been authorized to guarantee the extended bonds. According to the division report, the extension of the bonds will accomplish a refunding as of their maturity but will continue in effect the lien securing them. This transaction and others pending will leave the road with interest-bearing obligations totaling $41,752,400, as compared with $73,022,800 on December 15, 1942, a reduction of $31,270,400.

ERIE.—*Annual Report.*—In his annual report letter to the Erie's stockholders, Robert E. Woodruff, president, points out that while railroad freight rates remained stationary throughout the war and 25 per cent lower than they were in 1921, railroad wage costs have increased 29 per cent, and material costs 24 per cent, since 1939. Further complicating the outlook, he states, is the fact that 14 non-operating labor unions have demanded an increase of 30 cents per hour in basic rates, while the operating unions are demanding a flat increase of $2.50 a day.

In the face of higher wage and material costs, the Erie's operating revenues dropped 11 per cent—from $156,720,899 in 1944 to $139,491,426 in 1945. The percentage of return earned upon the investment in road and equipment property was equal to 3 per cent. Comparing the same two years, operating expenses mounted 8.9 per cent from $109,122,118 to $118,861, 130; of which the expense for maintaining roadway and structures increased 7.9 per cent or $1,286,836; equipment maintenance increased 20.7 per cent or $5,540,891; and transportation expense 1.1 per cent or $629,197. Wages totalling $64,489,980 were paid in 1945 and now represent 46.01 cents per dollar of income. Net income after all charges was $5,797,185, equivalent to $1.54 per common share against $7,660,157 or $2.30 per share in 1944. The net income for the year represents 4.1 per cent of gross income.

Mr. Woodruff pointed out that the railroad's long and short term debt showed a further substantial reduction. On December 21, 1941, the day preceding the Erie's release from bankruptcy, the long and short term debt was $299,000,000. On December 31, 1945, it was $188,000,000, a reduction of $111,000,000 with consequent reduction in interest charges. Fixed interest charges amounted to $5,682,158 in 1945, or $8,864,552 less than the last full year prior to reorganization. With the refinancing accomplished during the past year, it is expected that charges will be under $5,000,000 in 1946. The total of fixed charges and contingent interest will be less in 1946 than were the fixed charges alone in 1941 on the basis of the plan of reorganization.

The report stated that during the year, 46 new industries have been located on the Erie, which would produced an estimated annual revenue of $760,000. The great majority of the plants which were built or expanded for war production will be retained by the present occupants for peacetime operations.

The financial statistics for 1945 and 1944 follow:

	1945	1944
Operating revenues	$139,491,426	$156,720,899
Operating expenses	118,861,130	109,122,118
Taxes (federal, state and local)	415,744 Cr.	24,015,419
Income avail. for fixed charges	14,602,081	17,894,121
Fixed charges	5,682,158	5,978,963
Times fixed charges earned	2.57	2.99
Contingent interest — Income Bonds	2,265,827	2,282,951
Net income (before preferred or common dividends)	5,797,185	7,660,157
Earnings per common share	1.54	2.30
Total common stock dividends	2,455,793	2,455,793

GREAT NORTHERN. — *Refunding.*—This company has applied to the Interstate Commerce Commission for authority to issue $40,000,000 of series P general mortgage gold bonds due in 1982, and $35,000,000 of series Q due in 2010, the interest rates thereon to be determined by competitive bidding. The proceeds and other funds are to be employed to retire on July 1 the following outstanding general mortgage gold bonds; $30,000,000 of 3⅝ per cent series L, due in 1970 and callable at 105⅜; $35,000,000 of 3½ per cent series M, due in 1980 and callable at 105¾; and $10,000,000 of 3⅛ per cent series K, due in 196 and callable at 105⅞. The application indicated that the company might later apply for authority to issue other new bonds to provide funds for the retirement at the same time of the $25,000,000 of series K that would remain outstanding upon completion of the present trnsaction.

NEW YORK CENTRAL.—*Concerned in Disposition of Control of Wheeling & Lake Erie.*—The New York Central has asked the Interstate Commerce Commission for permission to intervene in the proceedings in which the application of the New York, Chicago & St. Louis for authority to acquire control of the Wheeling & Lake Erie is under consideration (see *Railway Age* of January 19, page 215), in order to protect its interest in existing joint rate and trackage rights agreements with the Wheeling. It also has asked that, if such authority be granted the Nickel Plate, it be on condition that the New York Central may secure trackage rights agreements to afford it access to certain coal mines, the Wheeling lines involved being those from Dillonvale to Unionvale, Adena to Neffs, and Adena to New Athens, all in Ohio.

Average Prices Stocks and Bonds

	March 12	Last week	Last year
Average price of 20 representative railway stocks	62.06	61.77	49.93
Average price of 20 representative railway bonds	102.35	102.48	95.69

Dividends Declared

Akron Canton & Youngstown.—5% preferred, semi-annually, $2.50, payable April 1 to holders of record March 15.

Little Miami.—Special, quarterly, 50¢; $4.30 original stock, $1, both payable March 9 to holders of record February 25.

Maine Central.—6% prior preferred, quarterly, $1.50, payable April 1 to holders of record March 23.

Pittsburgh Fort Wayne & Chicago.—Common, quarterly, $1.75, payable April 1 to holders of record March 11; and 7% preferred, quarterly, $1.75, payable April 2 to holders of record March 11.

Southern; M. & O. Stock Trust.—Semi-annually, $2.00, payable April 1 to holders of record March 15.

Abandonments

CHICAGO, BURLINGTON & QUINCY.—The Interstate Commerce Commission has reopened for reargument the proceedings in which this company was authorized by Division 4, with Commissioner Porter dissenting, to abandon a branch from Burch, Iowa, to Osceola, 53.15 miles, upon condition that alternative service be maintained under trackage rights on a line of the Chicago Great Western substantially parallel to the branch. (Previous item in *Railway Age* of January 12, page 170.)

Railway Officers

EXECUTIVE

Joseph R. Grimes, whose promotion to assistant to the vice-president, traffic, of the Chicago, Burlington & Quincy, with headquarters at Chicago, was reported in the *Railway Age* of February 9, was born at Lincoln, Neb., on December 8, 1914. He entered railway service on May 7, 1932, as a clerk of the Burlington at Omaha, Neb., subsequently serving as stenographer, tracing clerk, tariff clerk and rate clerk, with the same headquarters. On February 16,

Joseph R. Grimes

1939, Mr. Grimes was advanced to chief clerk of the division freight office at Casper, Wyo., and in the same year he was further advanced to city freight agent, with headquarters at Denver, Colo. In April,

News department continued on page 596

Freight Operating Statistics of Large Steam Railways—Selected

Region, road, and year		Miles of road operated	Train-miles	Locomotive-miles: Principal and helper	Locomotive-miles: Light	Car-miles: Loaded (*thousands*)	Car-miles: Per cent loaded	Ton-miles (*thousands*): Gross excl. locos. & tenders	Ton-miles (*thousands*): Net-rev. and non-rev.	Road locos. on line: Serviceable: Unstored	Road locos. on line: Serviceable: Stored	Road locos. on line: Per cent: B. O.	Road locos. on line: Per cent: B. O.
New England Region:													
Boston & Albany	1945	362	150,802	164,240	19,593	3,240	68.7	196,830	82,699	69	...	14	16.9
	1944	362	168,868	197,501	41,932	4,199	67.9	262,076	112,745	69	...	24	25.8
Boston & Maine	1945	1,777	326,167	341,843	15,877	11,815	72.2	724,493	322,054	119	1	19	13.7
	1944	1,777	356,579	377,462	19,161	13,395	68.9	856,519	379,881	139	12	22	12.7
N. Y., New H. & Hartf.†	1945	1,815	385,158	537,746	35,466	14,219	74.8	809,679	362,027	199	25	53	19.5
	1944	1,815	481,051	598,277	57,836	17,674	69.7	1,062,636	463,448	214	11	31	16.6
Great Lakes Region:													
Delaware & Hudson	1945	846	290,247	351,246	35,542	12,128	67.8	874,943	469,621	125	65	38	16.7
	1944	846	315,546	383,277	36,219	13,218	68.1	920,214	480,096	129	62	35	15.5
Del., Lack. & Western	1945	971	300,963	342,963	43,360	12,280	71.8	796,231	379,845	117	26	33	18.8
	1944	971	393,032	464,592	75,581	15,500	67.6	1,030,350	477,024	149	16	40	19.5
Erie	1945	2,242	776,395	823,353	65,560	35,014	67.9	2,247,209	967,585	296	23	74	18.8
	1944	2,243	917,773	978,489	78,618	42,312	67.9	2,712,994	1,202,631	328	14	58	14.5
Grand Trunk Western	1945	1,026	251,356	261,722	2,039	7,118	69.5	444,336	194,357	63	.	11	14.9
	1944	1,026	274,964	283,217	2,519	8,197	67.6	525,159	233,354	67	1	11	13.9
Lehigh Valley	1945	1,242	323,092	351,087	55,846	12,590	66.5	880,032	431,293	117	33	19	11.2
	1944	1,247	495,622	544,782	70,216	20,316	61.7	1,434,281	671,120	155	.	12	7.2
New York Central	1945	10,331	3,194,461	3,434,087	243,780	110,112	64.2	7,607,334	3,561,402	1,053	15	348	24.6
	1944	10,325	3,582,832	3,844,180	246,190	128,612	64.8	8,845,706	4,163,226	1,112	14	275	19.6
New York, Chi. & St. L.	1945	1,656	602,415	615,954	8,483	22,225	69.7	1,423,038	646,174	148	14	28	14.7
	1944	1,656	801,775	816,846	12,704	31,104	69.4	1,987,716	913,721	178	5	22	10.7
Pere Marquette	1945	1,915	345,401	355,547	9,937	10,646	68.8	710,454	335,507	122	14	25	15.5
	1944	1,915	429,623	442,348	9,976	14,130	69.8	932,718	450,606	147	...	22	13.0
Pitts. & Lake Erie	1945	229	97,072	98,704	110	3,533	61.3	307,226	176,206	34	...	18	34.6
	1944	229	87,767	94,960	27	3,504	65.6	292,817	171,343	31	...	15	32.6
Wabash	1945	2,381	649,195	678,037	16,447	21,273	71.8	1,351,487	612,171	165	15	31	14.7
	1944	2,381	774,411	800,470	19,186	27,017	72.7	1,717,274	809,424	177	3	35	16.3
Central Eastern Region:													
Baltimore & Ohio	1945	6,103	2,084,933	2,566,716	271,412	66,623	63.8	4,819,336	2,360,718	907	33	238	20.2
	1944	6,106	2,268,798	2,780,904	285,642	74,069	66.0	5,227,967	2,587,735	938	4	214	18.5
Central of New Jersey†	1945	649	173,729	202,811	41,726	5,700	67.3	423,013	225,708	100	7	41	27.7
	1944	654	223,255	264,309	56,189	8,091	62.8	591,826	294,515	123	7	22	14.5
Chicago & Eastern Ill.	1945	910	188,973	191,412	3,728	4,861	71.5	325,743	165,628	56	1	18	24.0
	1944	912	267,988	273,123	8,298	7,843	63.0	545,248	255,230	75	...	6	7.4
Elgin, Joliet & Eastern	1945	392	115,968	124,547	3,962	3,317	65.5	256,837	138,717	52	...	24	31.6
	1944	392	136,078	140,948	4,611	3,785	64.8	299,305	162,034	62	...	14	18.4
Long Island	1945	372	32,768	34,458	16,202	363	57.2	25,360	10,691	46	...	5	9.8
	1944	372	35,024	36,400	16,497	363	56.1	25,990	10,717	47	...	4	7.8
Pennsylvania System	1945	10,033	3,824,062	4,440,700	615,863	134,421	64.7	9,395,432	4,480,556	1,921	29	248	11.3
	1944	9,868	4,434,447	5,138,489	714,812	160,407	64.7	11,109,518	5,297,665	2,013	...	214	9.6
Reading	1945	1,361	511,519	565,872	65,698	15,884	65.1	1,222,537	669,633	246	5	69	21.6
	1944	1,371	590,488	655,729	79,280	18,180	64.1	1,363,002	722,259	279	12	45	13.4
Pocahontas Region:													
Chesapeake & Ohio	1945	3,045	1,076,125	1,173,000	64,125	44,651	57.3	3,827,749	2,220,025	469	1	51	9.8
	1944	3,036	1,052,434	1,134,908	57,043	44,438	57.6	3,786,822	2,141,642	461	22	56	10.4
Norfolk & Western	1945	2,319	705,606	761,506	64,951	30,858	60.0	2,609,106	1,419,362	244	62	21	6.4
	1944	2,132	727,963	782,129	66,684	32,069	60.2	2,675,623	1,445,817	285	26	16	4.9
Southern Region:													
Atlantic Coast Line	1945	4,921	976,420	990,830	16,392	23,385	59.6	1,582,182	655,217	374	6	22	5.5
	1944	4,952	1,132,230	1,149,071	16,645	31,338	60.8	2,153,166	941,342	406	8	19	4.4
Central of Georgia†	1945	1,783	301,237	306,896	5,759	6,800	69.1	439,965	199,309	95	...	8	7.8
	1944	1,783	370,346	379,509	7,818	8,686	69.3	572,310	266,868	91	...	16	15.0
Gulf, Mobile & Ohio	1945	1,931	315,260	385,057	2,157	10,058	71.3	660,596	318,377	99	4	10	8.8
	1944	1,952	272,885	343,396	2,337	9,751	75.5	610,060	296,699	103	2	8	7.1
Illinois Central (incl.	1945	6,605	1,499,176	1,521,261	55,112	48,499	62.2	3,438,623	1,591,847	618	26	67	9.4
Yazoo & Miss. Vy.)	1944	6,347	1,641,419	1,658,018	31,758	61,083	64.4	4,234,392	2,005,707	636	1	56	8.1
Louisville & Nashville	1945	4,749	1,530,828	1,662,710	43,139	36,155	63.3	2,581,914	1,301,555	409	15	45	9.6
	1944	4,743	1,644,968	1,789,927	47,665	41,804	65.6	2,923,465	1,493,595	416	2	70	14.3
Seaboard Air Line*	1945	4,139	912,754	953,001	17,190	24,693	66.2	1,628,168	697,700	283	...	49	14.8
	1944	4,161	925,293	978,192	13,851	26,671	68.4	1,747,967	783,945	301	...	38	11.2
Southern	1945	6,450	1,958,227	1,985,405	30,789	42,638	67.2	2,751,825	1,242,327	612	14	97	13.4
	1944	6,471	2,110,170	2,154,095	40,334	46,981	69.7	2,988,580	1,380,810	609	...	98	13.9
Northwestern Region:													
Chi. & North Western	1945	8,062	1,019,475	1,057,063	25,439	29,967	68.9	1,984,800	943,960	376	11	116	23.1
	1944	8,069	1,044,859	1,097,022	25,615	32,907	71.0	2,177,820	1,020,117	362	11	114	23.4
Chicago Great Western	1945	1,445	289,628	295,201	15,208	8,610	67.8	572,354	247,205	69	...	7	9.2
	1944	1,445	281,990	288,452	9,026	8,570	72.4	550,233	250,007	66	...	10	13.2
Chi., Milw., St. P. & Pac.†	1945	10,725	1,377,466	1,467,716	87,481	43,794	68.3	2,919,331	1,381,697	500	19	86	14.2
	1944	10,715	1,601,980	1,717,479	86,034	55,236	68.9	3,653,049	1,747,721	514	39	71	11.4
Chi., St. P., Minneap. & Om.	1945	1,606	206,701	220,579	14,425	5,320	71.4	349,584	162,262	90	1	28	23.5
	1944	1,606	221,629	239,779	13,654	5,807	69.2	395,325	190,215	96	19	15	11.5
Duluth, Missabe & I. R.	1945	546	25,393	25,615	634	377	62.8	24,049	11,409	26	20	18	28.1
	1944	546	23,385	23,657	648	364	65.2	23,167	11,573	22	14	25	41.0
Great Northern	1945	8,236	1,055,248	1,054,794	39,235	35,007	71.0	2,293,064	1,078,534	342	48	58	12.9
	1944	8,276	1,230,308	1,230,227	53,734	45,519	70.6	3,032,276	1,447,323	422	19	44	9.1
Min., St. P. & S. St. M.	1945	4,181	463,000	475,053	10,018	11,705	68.0	778,757	368,416	127	...	9	6.6
	1944	4,259	425,135	436,907	7,613	10,920	65.5	743,105	347,794	119	6	6	4.6
Northern Pacific	1945	6,576	844,754	894,394	70,061	29,534	74.5	1,977,131	993,949	365	9	64	14.6
	1944	6,570	969,740	1,039,759	81,744	39,720	73.6	2,655,280	1,335,190	387	12	54	11.9
Central Western Region:													
Alton†	1945	915	216,561	224,169	590	5,057	70.7	332,158	175,642	80	1	13	13.8
	1944	915	277,604	290,984	1,401	7,158	70.2	470,425	224,525	74	...	5	6.3
Atch., Top. & S. Fe (incl.	1945	13,108	2,768,015	2,962,403	159,360	96,850	70.5	6,182,215	2,544,027	838	29	134	13.4
G. C. & S. F. & P. & S. F.)	1944	13,092	3,531,571	3,766,234	212,933	126,220	66.6	8,284,596	3,419,995	912	5	88	8.8
Chi., Burl. & Quincy	1945	8,666	1,400,568	1,472,460	49,153	48,024	64.7	3,313,669	1,526,677	474	...	62	11.6
	1944	8,790	1,450,586	1,523,934	54,129	54,197	67.6	3,695,631	1,767,721	502	...	62	11.0
Chi., Rock I. & Pac.†	1945	7,715	1,255,357	1,284,509	25,268	37,473	67.5	2,417,098	1,069,945	388	...	72	15.7
	1944	7,717	1,410,170	1,470,375	13,067	41,740	68.6	2,701,475	1,221,941	387	...	77	16.6
Denver & R. G. Wn.†	1945	2,386	368,435	404,259	66,217	10,810	77.2	702,446	355,009	142	7	36	19.5
	1944	2,386	455,495	511,186	74,107	16,076	77.4	1,029,398	520,802	173	4	33	15.7
Southern Pacific—Pac. Lines	1945	8,173	1,775,312	2,018,710	356,844	74,372	75.0	4,602,282	2,037,699	748	...	166	18.1
	1944	8,179	2,192,630	2,486,989	391,941	94,200	70.7	5,994,846	2,615,275	783	...	155	16.5
Union Pacific	1945	9,777	2,469,730	2,577,018	189,152	88,045	71.3	5,526,112	2,506,446	741	77	103	11.2
	1944	9,781	3,168,038	3,390,704	290,418	118,302	69.8	7,681,619	3,874,774	843	5	61	6.7
Southwestern Region:													
Mo.-Kans.-Texas Lines	1945	3,241	531,755	543,776	10,914	13,187	66.2	871,116	391,780	133	16	19	11.3
	1944	3,241	852,442	884,448	16,119	22,608	61.5	1,550,142	697,264	159	...	15	8.6
Missouri Pacific†	1945	7,054	1,378,628	1,454,466	38,483	44,552	66.2	3,005,518	1,351,415	432	1	72	14.3
	1944	7,056	1,693,685	1,777,830	47,804	58,861	67.9	3,929,591	1,825,748	463	...	67	12.6
Texas & Pacific	1945	1,871	353,015	353,015	6,717	11,097	67.5	726,370	298,705	121	30	12	7.4
	1944	1,882	435,704	435,704	7,505	15,025	68.5	970,433	411,207	135	9	14	8.9
St. Louis-San Francisco†	1945	4,615	1,009,016	1,064,084	14,194	22,480	65.5	1,512,808	676,995	319	...	27	7.8
	1944	4,616	1,122,922	1,192,756	24,482	26,457	67.9	1,735,971	796,181	323	...	27	7.7
St. Louis-San Fran. & Texas	1945	161	36,109	38,608	3	617	66.4	41,436	18,005	8	...	1	11.1
	1944	159	35,976	37,078	.	547	74.4	34,611	14,519	8	...		
St. Louis Southw. Lines†	1945	1,600	350,130	354,330	4,766	12,204	78.1	702,099	313,848	93	19	27	19.4
	1944	1,600	518,460	528,774	7,072	18,633	70.9	1,168,638	534,458	112	4	23	16.5
Texas & New Orleans	1945	4,321	865,729	867,217	15,573	23,741	73.3	1,495,061	678,750	226	5	42	15.4
	1944	4,331	1,176,723	1,179,736	45,204	30,711	65.3	2,065,242	914,000	257	...	24	8.5

* Report of receivers.
† Report of trustee or trustees.
Compiled by the Bureau of Transport Economics and Statistics, Interstate Commerce Commission. Subject to revision.

Items for the Month of December, 1945, Compared with December, 1944

Region, road, and year		Freight cars on line: Home	Foreign	Total	Per Cent B. O.	G.t.m. per train-hr. excl.locos. and tenders	G.t.m. per train-mi. excl.locos. and tenders	Net ton-mi. per train-mile	Net ton-mi. per l'd. car-mile	Net ton-mi. per car-day	Car miles per car-day	Net daily ton-mi. per road-mi.	Coal lb. per 1000 g.t.m. inc. loco.	Mi. per loco. per day
New England Region:														
Boston & Albany	1945	363	6,099	6,462	0.4	19,665	1,316	553	25.5	430	24.5	7,369	242	76.4
	1944	298	6,852	7,150	0.3	21,508	1,565	673	26.9	550	30.2	10,047	230	92.0
Boston & Maine	1945	1,816	12,731	14,547	2.0	33,080	2,229	991	27.3	770	39.1	5,846	116	87.7
	1944	2,197	11,299	13,496	4.2	37,318	2,411	1,069	28.4	916	46.9	6,896	113	78.0
N. Y., New H. & Hartf.†	1945	2,013	22,031	24,044	3.1	26,358	2,112	845	25.5	498	26.2	6,434	103	72.2
	1944	2,433	22,202	24,635	3.0	31,759	2,246	980	26.2	627	34.3	8,237	107	83.3
Great Lakes Region:														
Delaware & Hudson	1945	3,053	6,375	9,428	3.6	50.610	3,032	1,627	38.7	1,669	63.6	17,907	117	59.1
	1944	3,764	5,403	9,167	3.4	49,196	2,934	1,531	36.3	1,753	70.9	18,306	119	63.1
Del., Lack. & Western	1945	4,900	12,305	17,205	4.2	37,907	2,684	1,281	30.9	737	33.2	12,619	130	71.4
	1944	6,151	14,675	20,826	2.8	36,868	2,647	1,226	30.8	763	36.7	15,847	140	91.6
Erie	1945	9,826	25,277	35,103	3.9	46,211	2,918	1,256	27.6	874	46.6	13,922	113	79.2
	1944	10,418	29,177	39,595	3.0	49,202	2,976	1,319	28.4	1,031	53.4	17,296	110	91.9
Grand Trunk Western	1945	3,253	6,906	10,159	4.6	36,532	1,775	776	27.3	611	32.5	6,111	98	123.8
	1944	2,750	7,235	9,985	3.8	39,888	1,929	857	28.5	754	39.2	7,337	95	126.9
Lehigh Valley	1945	6,824	14,436	21,260	3.8	46,501	2,827	1,386	34.3	655	28.7	11,202	123	82.2
	1944	7,558	22,666	30,224	1.9	45,287	2,982	1,395	33.0	739	36.2	17,361	128	124.7
New York Central	1945	54,459	110,167	164,626	3.9	35,328	2,429	1,137	32.3	744	35.8	11,120	127	93.9
	1944	47,109	105,320	152,429	3.1	36,350	2,510	1,182	32.4	931	44.3	13,007	120	104.8
New York, Chi. & St. L.	1945	2,721	11,962	14,683	3.3	42,671	2,388	1,084	29.1	1,380	68.1	12,587	105	112.0
	1944	2,431	15,853	18,284	2.1	42,412	2,504	1,151	29.4	1,732	85.0	17,799	101	135.5
Pere Marquette	1945	4,013	8,541	12,554	5.7	36,301	2,071	978	31.5	797	36.7	5,652	106	78.5
	1944	2,276	8,974	11,250	2.7	37,756	2,200	1,063	31.9	1,248	56.1	7,590	106	92.0
Pitts. & Lake Erie	1945	3,405	8,847	12,252	4.7	44,487	3,167	1,817	49.9	462	15.1	24,821	95	68.6
	1944	3,907	8,677	12,584	4.3	42,394	3,347	1,958	48.9	435	13.6	24,136	112	71.4
Wabash	1945	6,053	14,817	20,870	4.6	39,269	2,111	956	28.8	974	47.2	8,294	131	110.9
	1944	6,190	12,832	19,022	3.2	43,079	2,247	1,059	30.0	1,419	65.1	10,966	122	127.2
Central Eastern Region:														
Baltimore & Ohio	1945	36,439	42,141	78,580	5.7	27,639	2,371	1,162	35.4	877	38.8	12,478	175	81.0
	1944	39,172	49,841	89,013	3.6	27,466	2,357	1,167	34.9	897	38.9	13,671	170	88.3
Central of New Jersey†	1945	4,826	13,404	18,230	6.5	29,604	2,530	1,350	39.6	399	15.0	11,219	138	68.0
	1944	5,171	14,171	19,342	4.2	31,791	2,655	1,321	36.4	484	21.1	14,527	144	86.1
Chicago & Eastern Ill.	1945	2,175	3,563	5,738	5.9	29,824	1,743	886	34.1	882	36.2	5,871	148	86.0
	1944	2,190	3,930	6,120	4.1	34,562	2,104	985	32.5	1,262	61.5	9,028	130	115.3
Elgin, Joliet & Eastern	1945	7,385	7,277	14,662	3.0	16,225	2,342	1,265	41.8	316	11.5	11,415	169	83.3
	1944	8,519	7,198	15,717	2.6	15,398	2,341	1,267	42.8	333	12.0	13,334	166	94.4
Long Island	1945	32	5,614	5,646	.4	6,222	790	333	29.5	63	3.7	927	383	46.7
	1944	38	5,300	5,338	.4	6,501	758	312	29.5	61	3.7	929	346	48.2
Pennsylvania System	1945	124,979	117,847	242,826	6.4	33,137	2,540	1,211	33.3	598	27.7	14,406	148	80.2
	1944	119,593	126,959	246,552	3.4	33,099	2,590	1,235	33.0	697	32.6	17,318	145	92.1
Reading	1945	11,302	27,198	38,500	2.7	30,318	2,396	1,312	42.2	585	21.3	15,871	126	72.8
	1944	13,342	21,362	34,704	2.3	29,208	2,310	1,224	39.7	638	25.0	16,994	138	81.8
Pocahontas Region:														
Chesapeake & Ohio	1945	35,495	14,743	50,238	1.8	50,591	3,630	2,105	49.7	1,323	46.4	23,518	96	83.8
	1944	39,432	14,170	53,602	1.9	50,646	3,655	2,067	48.2	1,299	46.8	22,755	93	78.8
Norfolk & Western	1945	28,992	7,025	36,017	.9	59,220	3,760	2,045	46.0	1,262	45.7	21,405	103	85.9
	1944	32,532	6,485	39,017	1.2	57,532	3,752	2,027	45.1	1,204	44.4	21,876	106	89.4
Southern Region:														
Atlantic Coast Line	1945	9,043	20,035	29,078	1.2	26,345	1,629	675	28.0	746	44.7	4,295	130	83.3
	1944	8,471	24,382	32,853	1.4	29,292	1,915	837	30.0	973	53.3	6,132	108	93.1
Central of Georgia†	1945	1,977	5,006	6,983	1.7	28,093	1,466	664	29.3	838	41.3	3,606	157	104.1
	1944	2,212	6,642	8,854	1.1	29,298	1,571	733	30.7	988	46.4	4,828	148	124.1
Gulf, Mobile & Ohio	1945	2,239	6,575	8,814	.9	36,138	2,098	1,011	31.7	1,156	51.2	5,319	129	115.9
	1944	1,903	6,854	8,757	.6	38,996	2,239	1,089	30.4	1,017	44.3	4,931	124	100.9
Illinois Central (incl.	1945	18,873	39,228	58,101	.9	38,301	2,367	1,096	32.8	936	45.8	7,774	148	76.6
Yazoo & Miss. Vy.)	1944	20,034	30,786	50,820	.9	41,717	2,647	1,254	32.8	1,216	57.5	10,194	133	81.4
Louisville & Nashville	1945	30,354	14,170	44,524	4.6	26,440	1,687	850	36.0	928	40.7	8,841	144	119.6
	1944	31,132	14,928	46,060	3.3	27,088	1,777	908	35.7	1,072	45.7	10,158	148	126.2
Seaboard Air Line*	1945	6,766	19,435	26,201	2.0	31,579	1,820	780	28.3	884	47.3	5,438	137	101.8
	1944	6,669	19,368	26,037	1.9	31,763	1,931	866	29.4	994	49.5	6,078	130	104.6
Southern	1945	16,657	33,919	50,576	4.6	23,740	1,428	645	29.1	778	39.7	6,213	167	95.1
	1944	16,117	33,082	49,199	2.7	22,898	1,437	664	29.4	897	43.8	6,883	166	106.0
Northwestern Region:														
Chi. & North Western	1945	20,068	37,105	57,173	4.5	29,672	2,019	960	31.5	546	25.2	3,777	161	75.2
	1944	21,193	30,831	52,024	4.0	33,107	2,160	1,012	31.0	629	28.6	4,078	141	80.6
Chicago Great Western	1945	1,011	6,135	7,146	3.3	31,503	1,986	858	28.7	1,186	61.0	5,519	150	136.7
	1944	886	3,989	4,875	2.2	33,811	1,958	890	29.2	1,598	75.6	5,581	143	128.3
Chi., Milw., St. P. & Pac.†	1945	22,745	41,140	63,885	1.7	31,284	2,142	1,014	31.5	721	33.5	4,156	141	89.4
	1944	21,593	32,919	54,512	2.0	36,237	2,299	1,100	31.6	1,063	48.7	5,262	130	100.3
Chi., St. P., Minneap. & Om.	1945	891	8,006	8,897	6.7	21,310	1,715	796	30.5	632	29.1	3,259	139	68.6
	1944	808	6,296	7,104	5.4	25,803	1,845	888	32.8	875	38.6	3,821	119	65.3
Duluth, Missabe & I. R.	1945	14,935	424	15,359	3.9	13,821	1,001	475	30.3	24	1.3	674	229	17.2
	1944	15,156	406	15,562	3.7	14,161	1,044	521	31.8	24	1.2	684	172	17.3
Great Northern	1945	20,899	15,012	35,911	3.3	32,991	2,204	1,037	30.8	933	42.6	4,224	122	82.8
	1944	20,283	17,656	37,939	1.8	37,774	2,482	1,184	31.8	1,180	52.5	5,641	115	90.9
Min., St. P. & S. St. M.	1945	4,783	9,160	13,943	4.2	27,941	1,707	807	31.5	794	37.1	2,842	121	116.1
	1944	5,533	6,422	11,955	2.6	30,949	1,753	821	31.8	879	42.1	2,634	109	108.0
Northern Pacific	1945	16,222	18,094	34,316	5.3	33,214	2,382	1,198	33.7	914	36.5	4,876	147	76.8
	1944	13,828	21,149	34,977	2.8	41,257	2,752	1,384	33.6	1,236	50.0	6,556	142	86.6
Central Western Region:														
Alton†	1945	2,191	6,255	8,446	1.2	33,286	1,557	823	34.7	653	26.6	6,192	164	83.6
	1944	1,327	7,050	8,377	2.0	35,164	1,721	821	31.4	853	38.8	7,916	145	122.8
Atch., Top. & S. Fe (incl.	1945	39,352	39,310	78,662	4.6	41,576	2,249	925	26.3	1,051	56.8	6,261	126	105.3
G. C. & S. F. & P. & S. F.)	1944	41,461	54,948	96,409	2.5	41,739	2,367	977	27.1	1,114	61.7	8,427	123	133.4
Chi., Burl. & Quincy	1945	16,332	26,751	43,083	3.6	37,284	2,382	1,098	31.8	1,095	53.2	5,683	132	98.9
	1944	15,850	27,384	43,234	2.6	40,762	2,560	1,225	32.6	1,227	55.6	6,487	119	96.7
Chi., Rock I. & Pac.†	1945	11,007	27,026	38,033	3.9	31,604	1,944	860	28.6	923	47.9	4,474	135	96.7
	1944	9,126	24,221	33,347	4.6	34,256	1,930	873	29.3	1,169	58.2	5,108	125	106.9
Denver & R. G. Wn.†	1945	7,704	6,015	13,719	4.5	29,135	1,929	975	32.8	822	32.4	4,800	189	77.8
	1944	7,660	6,701	14,361	4.2	35,176	2,283	1,155	32.4	1,083	43.2	7,041	182	90.8
Southern Pacific—Pac. Lines	1945	22,790	41,730	64,520	3.1	37,031	2,618	1,159	27.4	992	48.3	8,043	114	87.5
	1944	22,952	58,171	81,123	2.1	36,728	2,759	1,204	27.8	996	50.8	10,315	108	103.9
Union Pacific	1945	25,154	29,819	54,973	3.6	43,490	2,280	1,034	28.5	1,365	67.3	8,270	142	99.6
	1944	26,783	40,793	67,576	2.2	45,491	2,451	1,237	32.8	1,797	78.6	12,779	131	132.7
Southwestern Region:														
Mo.-Kans.-Texas Lines	1945	1,661	6,464	8,125	.1	31,341	1,643	739	29.7	1,563	79.4	3,899	92	113.2
	1944	1,283	10,256	11,539	.3	33,401	1,826	821	30.8	2,132	112.3	6,940	96	176.7
Missouri Pacific†	1945	15,440	27,221	42,661	1.6	35,673	2,195	987	30.3	1,049	52.3	6,180	134	100.4
	1944	13,499	27,266	40,765	1.1	38,878	2,338	1,086	31.0	1,444	68.5	8,347	120	117.1
Texas & Pacific	1945	1,798	5,150	6,948	2.2	38,343	2,074	853	26.9	1,270	69.9	5,150	100	75.9
	1944	1,754	6,675	8,429	1.3	39,860	2,241	950	27.4	1,547	82.5	7,048	97	99.1
St. Louis-San Francisco†	1945	7,235	12,637	19,872	2.1	29,238	1,510	676	30.1	1,024	51.9	4,732	156	105.9
	1944	7,302	11,764	19,066	2.0	30,301	1,556	714	30.1	1,301	63.7	5,564	152	116.9
St. Louis-San Fran. & Texas	1945	....	292	292	4.5	21,581	1,153	501	29.2	1,809	93.4	3,607	123	139.7
	1944	..	303	303	2.0	19,444	970	407	26.5	1,725	87.3	2,946	134	151.7
St. Louis Southw. Lines†	1945	1,304	4,208	5,512	2.9	37,825	2,012	899	25.7	1,641	81.7	6,328	100	88.2
	1944	1,026	7,769	8,795	1.1	35,963	2,258	1,033	28.7	1,954	96.1	10,775	90	130.4
Texas & New Orleans	1945	3,853	14,328	18,181	4.4	31,603	1,742	791	28.6	1,119	53.4	5,067	101	109.2
	1944	3,962	17,854	21,816	2.4	30,890	1,772	784	29.8	1,359	69.9	6,808	99	145.9

* Report of receivers.
† Report of trustee or trustees.

1943, he served as commercial agent at Oklahoma City, Okla., and on September 1, 1944, he was promoted to general agent, with headquarters at Chicago, the position he held at the time of his new appointment.

John A. Appleton, recently returned from overseas service in the Transportation Corps of the United States Army, and formerly general manager of the Pennsylvania's New York zone, has been appointed assistant vice president—operation, of the Pennsylvania, with headquarters at Philadelphia, Pa.

Guy N. Curley, superintendent of the Farnham division of the Canadian Pacific, with headquarters at Farnham, Que., has been appointed assistant to the vice-president and general manager at Toronto, Ont., succeeding **J. Russell Kimpton,** whose promotion is announced elsewhere in these columns.

Louis M. Stuart, whose promotion to assistant to the president of the Missouri-Kansas-Texas, with headquarters at St. Louis, Mo., was reported in the *Railway Age* of March 2, was born at Parsons, Kan., on January 6, 1894. He entered

Louis M. Stuart

railway service in July, 1909, as a stenographer of the M-K-T, subsequently holding various minor positions at Parsons until October, 1916, when he was advanced to secretary to the general manager, with the same headquarters. In January, 1917, Mr. Stuart was appointed transportation clerk at Parsons, and in May, 1923, he was transferred to Denison, Tex. He later became transportation inspector and merchandise supervisor until he was advanced to general merchandising agent, the position he held at the time of his new appointment.

A. P. McLure, for many years president and general manager of the Lancaster & Chester at Lancaster, S. C., and more recently vice-chairman of the board of directors, retired on January 1. Mr. McLure was born in 1868 and entered railroading in 1886, subsequently serving various roads for twelve years before joining the Lancaster & Chester as auditor in 1898.

FINANCIAL, LEGAL AND ACCOUNTING

Robert L. Holder, whose appointment as auditor disbursements of the Piedmont & Northern and the Durham & Southern, with headquarters at Charlotte, N. C., was announced in the February 2 issue of *Railway Age,* was born on February 19, 1899, at Durham, N. C. Mr. Holder began his railroad career there in 1911, as a clerk for the Southern. He subsequently became assistant cashier, and was promoted

Robert L. Holder

to cashier, with headquarters at Raleigh, N. C., in 1912. From 1913 to 1918, Mr. Holder was manager of the premium department and factory cost accounting for the Liggett & Myers Tobacco Company at Durham, after which he joined the Durham & Southern as a clerk, advancing successively to bookkeeper in 1920, to chief clerk in 1924, and to assistant auditor and chief clerk in 1930. In 1931, he was appointed general bookkeeper and valuation accountant for both the D. & S. and the P. & N. at Charlotte, advancing to chief clerk disbursements in 1943, which post he held until his promotion on January 1.

Anthony Kane, formerly connected with the legal department of the Great Northern, and recently discharged from the armed forces, has returned to the railroad and has been appointed assistant general counsel, with headquarters at St. Paul, Minn. Mr. Kane was born at Delano, Minn., and is a graduate of the University

Anthony Kane

of Washington. In 1935 he began the practice of law with the legal firm of Kerr, McCord & Carey at Seattle, Wash., entering railway service two years later as a member of the legal staff of the Great Northern, with the same headquarters. In 1942 he was granted a leave of absence to serve as executive officer of the judge advocate general's office at Washington, D. C., and also as chief of the Military Personnel and Training division of that office. He was discharged from military service with the rank of lieutenant-colonel.

Robert H. Bierma, formerly commerce attorney of the Chicago, Burlington & Quincy and recently honorably discharged from the U. S. Navy, has been appointed assistant general solicitor of the Pennsylvania, with headquarters at Chicago.

David I. Mackie, whose appointment as general counsel of the Delaware, Lackawanna & Western, with headquarters at New York, was announced in the March 9 issue of *Railway Age,* was graduated from Williams College in 1926 and from Harvard Law School in 1929, being admitted to the bar of the State of New York in December of the same year. After engaging in the practice of corporation, real estate, and tax law, he became associated with the firm of Hardy, Stancliffe & Hardy at New York in June, 1944, subsequently handling proceedings incident to the mer-

David I. Mackie

ger of the American Car & Foundry Motors Company with the Brill Corporation, which resulted in the ACF-Brill Motors Company. Mr. Mackie was appointed general solicitor of the D. L. & W. in March, 1945, and continued in that position until his promotion on March 4.

Arthur K. Marvin, whose appointment as land and tax agent of the New York, Susquehanna & Western, with headquarters at Paterson, N. J., was announced in the February 2 issue of *Railway Age,* was born at Stroudsburg, Pa., on August 1, 1901. He entered railroading there in 1918 as clerk to track supervisor for the New York, Susquehanna & Western, later transferring to Butler, N. J., in 1920, and then joining the Erie in the same capacity at Paterson in 1926. In 1927, he took over the duties of chief clerk to track supervisor for the Northern of New Jersey (now part of the Erie) and the New Jersey & New York, as well as maintaining his position for the Erie. Mr. Marvin became engineering accountant for the Erie and the N. Y. S. & W. in 1930, and was appointed assistant chief clerk to division engineer for these companies in 1934. In

News Department continued on next left-hand page

Sustained Speed . . . a first essential

To keep pace with the demands of the traveling public, in the years just ahead, the maintaining of faster train schedules will be a first essential.

To do this will require motive power capable of handling heavy trains at high speeds—and of sustaining such speeds on long runs.

Modern Lima-built steam locomotives not only meet these exacting demands, but operate with maximum efficiency and economy.

LIMA LOCOMOTIVE WORKS LIMA LOCOMOTIVE WORKS INCORPORATED INCORPORATED, LIMA, OHIO

1940, he was named chief clerk to chief engineer for the New York, Susquehanna & Western, and he held this post at the time of his appointment as land and tax agent.

OPERATING

D. G. Kissick, assistant superintendent of the Port Arthur division of the Canadian National at Winnipeg, Man., has been transferred to Vancouver, B. C., succeeding **F. Willcock,** who has retired.

John J. Boylan, superintendent of the Central Illinois division of the Railway Express Agency, has been appointed superintendent of claims at Chicago, succeeding **J. S. Smith,** who has retired after 54 years in express service.

F. M. Hair, whose appointment as general superintendent transportation of the Southern at Knoxville, Tenn., was announced in the *Railway Age* of March 2, was born at Blackville, S. C., on September 4, 1886, and entered railroading there as a clerk in the freight office of the Southern in July, 1904. After serving at various stations as a telegrapher, a yard clerk, and an agent, he was appointed dispatcher at

F. M. Hair

Charleston, S. C., in 1906, then promoted to chief dispatcher at Rock Hill ,S. C., in 1910, later transferring to Charleston and to Charlotte, N. C. In June, 1920, he was named trainmaster at Charlotte, and in July, 1927, returned to Charleston as superintendent, serving subsequently in that capacity at Columbia, S. C., Greensboro, N. C., and Knoxville, maintaining the latter post until his recent promotion.

C. K. Carter, Jr., superintendent for the Southern at Richmond, Va., has been transferred to the Washington division, with headquarters at Alexandria, Va., succeeding **W. H. DeButts,** who retired on March 15 after more than 23 years of service. **J. F. Beaver,** trainmaster at Greensboro, N. C., has been named superintendent at Richmond to succeed Mr. Carter.

Frederick W. Okie, whose promotion to general manager, western lines, of the Southern, with headquarters at Cincinnati, Ohio, was reported in the *Railway Age* of March 2, was born at Dayton, Ohio, on June 7, 1907, and is a graduate of the Virginia Military Institute. He entered railway service on June 20, 1924, working during summer school vacations in the engineering department of the Southern. On July 1, 1929, he was appointed a student apprentice and one year later he was ad-

Frederick W. Okie

vanced to assistant trainmaster, with headquarters at Oakdale, Tenn. On September 1, 1933, Mr. Okie was promoted to trainmaster, with the same headquarters, and in 1936 he was transferred to Birmingham, Ala. On February 1, 1938, he was advanced to division superintendent, working in this capacity on various divisions until 1942 when he entered the armed services. He returned to the Southern on January 1 of this year and shortly thereafter he was promoted to his new position at Cincinnati.

William J. McWhorter, whose promotion to general manager of the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn., was reported in the *Railway Age* of March 2, was born at McDaniels, Ga., on February 17, 1883, and entered railway service on July 15, 1904, as a telegraph operator on the N. C. & St. L. In July, 1906, he was advanced

William J. McWhorter

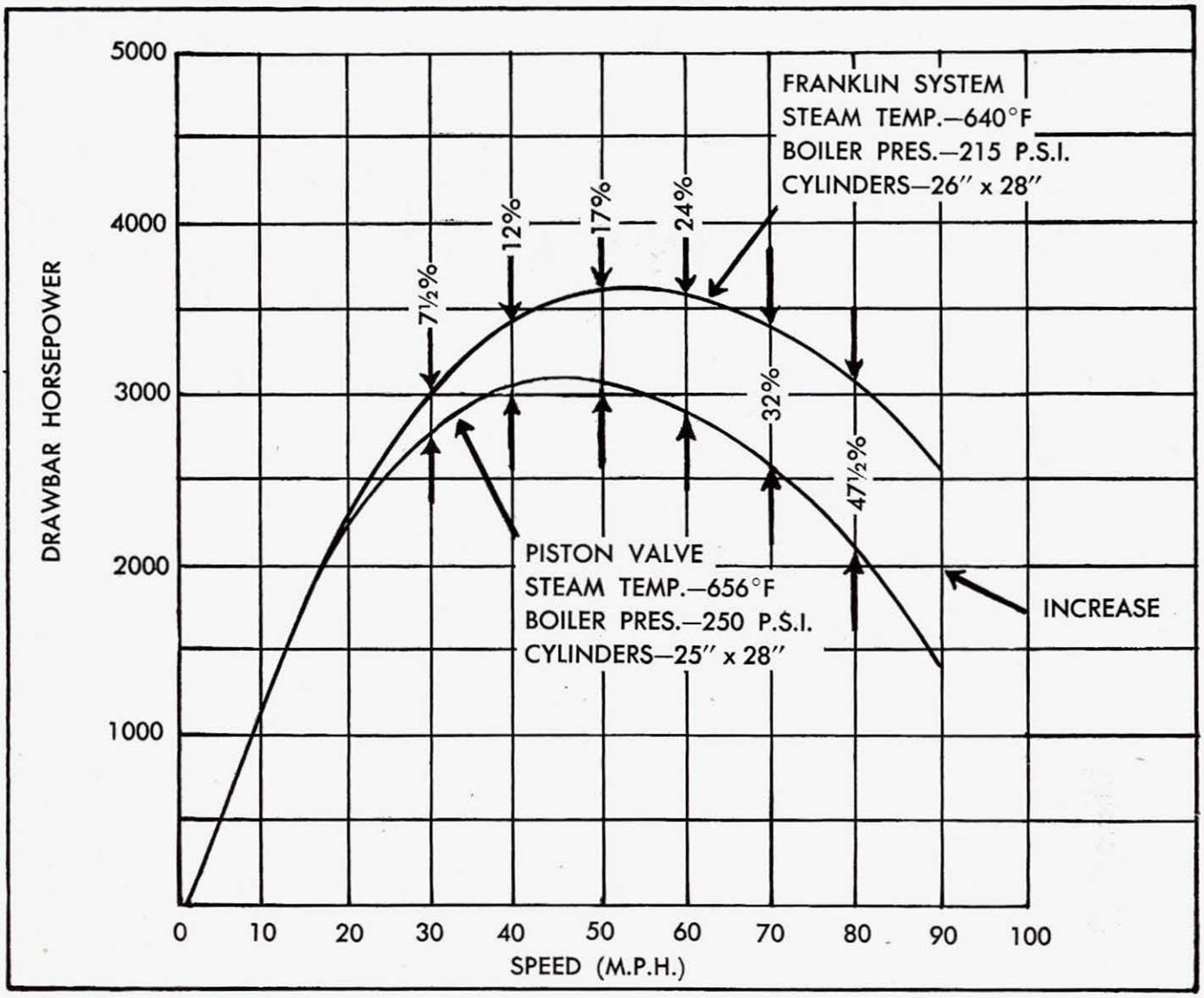
to train dispatcher and in 1916 he was further advanced to chief dispatcher. From 1918 to 1927 Mr. McWhorter served as trainmaster of the Atlantic division and as assistant superintendent of the Paducah and Memphis division, with headquarters at Bruceton, Tenn. In August of the latter year he was promoted to superintendent of the Nashville division, with headquarters at Nashville, and a short time later his jurisdiction was extended to include the Paducah and Memphis division and also the Paducah & Illinois railway. On February 1, 1937, he was advanced to assistant general manager of the N. C. & St. L., and on March 14, 1945, he was appointed acting general manager, the position he held at the time of his new promotion.

In the dining service department of the New York Central, **I. L. Austin** has been appointed superintendent of personnel, with headquarters at New York, and **T. H. Byrne** has been named assistant superintendent of personnel.

J. Russell Kimpton, assistant to the vice-president and general manager of the Canadian Pacific, at Toronto, Ont., has been appointed general superintendent, Quebec district, with headquarters at Montreal, Que., succeeding the late **R. W. Scott. Guy N. Curley,** superintendent of the Farnham division, at Farnham, Que., has been named to succeed Mr. Kimpton as assistant to the vice-president and general manager, while **Alan C. MacDonald** has been transferred from his post as superintendent of the Trenton division at Toronto to Farnham, succeeding Mr. Curley. **Leonard R. Bangs,** assistant superintendent of the Trenton division at Smith Falls, Ont., has been promoted to superintendent of that division, with headquarters at Toronto. **J. B. MacPherson,** recently a major in the Canadian Railway Operating Group, R. C. E., and formerly assistant superintendent of the London division, has been appointed assistant superintendent at Smith Falls, succeeding Mr. Bangs.

John A. Rogers, assistant general manager, Central region, of the Canadian National, with headquarters at Toronto, Ont., has been appointed general manager and chief engineer of the Central Vermont (part of the Canadian National), at St. Albans, Vt., succeeding **Roy D. Garner,** who retired on March 8, because of illness, and whose death on March 9 is reported elsewhere in these columns. **R. C. Johnston,** general superintendent, Southern Ontario district, of the Canadian National at Toronto, has been appointed assistant general manager there, succeeding Mr. Rogers. **W. E. Robinson,** general superintendent, Northern Ontario district, at North Bay, Ont., has been transferred to succeed Mr. Johnston, while **W. H. Kyle,** superintendent, Montreal terminals and St. Jerome divisions, at Montreal, Que., has been advanced to succeed Mr. Robinson at North Bay. **R. Hayes,** superintendent of the Ottawa division at Ottawa, Ont., has been transferred to Montreal, succeeding Mr. Kyle, and **W. J. Hotrum,** superintendent of the Capreol division at Capreol, Ont., has been transferred to Ottawa, succeeding Mr. Hayes. **J. R. Carr,** superintendent of terminals, Black Rock, N. Y., has been appointed superintendent at Capreol, succeeding Mr. Hotrum, while **J. H. Stevenson,** assistant superintendent at London, Ont., has been promoted to succeed Mr. Carr at Black Rock.

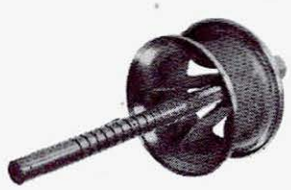
News Department continued on next left-hand page



To increase LOCOMOTIVE CAPACITY

• To increase the capacity of some of its older locomotives, a railroad found that the installation of The Franklin System of Steam Distribution would produce the drawbar horsepower shown on the chart above.

The alternative, involving higher steam pressure, would necessitate a new boiler, frame and running gear. Even then, the drawbar horsepower, with piston valves, would be substantially less than with The Franklin System.



You too may find that the answer to today's demand for greater power and speed is The Franklin System of Steam Distribution.

FRANKLIN RAILWAY SUPPLY COMPANY, INC.

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TRAFFIC

William A. Riggs, formerly a lieutenant in the United States Navy, has been appointed industrial geologist of the Atlantic Coast Line, with headquarters at Wilmington, N. C.

John A. Martin, whose appointment as assistant to freight traffic manager of the Baltimore & Ohio, with headquarters at Baltimore, Md., was announced in the January 26 *Railway Age,* was born on October

John A. Martin

31, 1890, at Hagerstown, Md., and entered railroad service in 1910 with the Western Maryland at Hagerstown. He joined the B. & O. in 1917 as a freight claim investigator, becoming a rate clerk in the freight traffic department, general freight office, in 1920, and transferring to the office of the vice-president in 1926. He was advanced to chief clerk to vice-president in 1934, then transferred to the post of chief clerk to freight traffic manager in 1941. Later that year, Mr. Martin was appointed assistant general freight agent at Baltimore, which position he held until his recent advancement.

David W. Sargent, Jr., who was recently honorably discharged from the U. S. Marine Corps, has been appointed an industrial agent of the Chicago, Burlington & Quincy, with headquarters at Chicago.

R. C. Courtney, district freight and passenger agent of the Southern, at Little Rock, Ark., has been promoted to division freight agent, with headquarters at Memphis, Tenn. **Harold F. Balte,** district freight agent at Cincinnati, Ohio, has been advanced to district freight and passenger agent at Little Rock, succeeding Mr. Courtney. **Paul E. Flury,** commercial agent, has been promoted to district freight agent, with headquarters as before at Cincinnati, replacing Mr. Balte.

R. R. Spangenberg, whose promotion to general passenger agent of the New York Central, with headquarters at St. Louis, Mo., was reported in the *Railway Age* of February 16, was born at St. Louis on December 5, 1903, and entered railway service on November 7, 1918, as a messenger on the Cleveland, Cincinnati, Chicago & St. Louis, part of the New York Central System, at St. Louis. From 1919 to 1926 Mr. Spangenberg served consecutively as station passenger agent, passenger agent and city passenger agent, with the same headquarters, and on January 1, 1927, he was promoted to district passenger agent, also at St. Louis. On June 1,

R. R. Spangenberg

1928, he was advanced to general agent, with headquarters at Houston, Tex., and on December 1, 1931, he was transferred to Dallas, Tex. On July 1, 1937, Mr. Spangenberg was promoted to assistant general passenger agent at St. Louis, the position he held at the time of his new appointment.

H. C. Carson, general passenger agent of the New York Central, with headquarters at Chicago, has been appointed general passenger traffic manager there, succeeding **A. W. Foellger,** whose retirement was announced in the March 9 *Railway Age.* **S. W. Bone** has been named general passenger agent to succeed Mr. Carson.

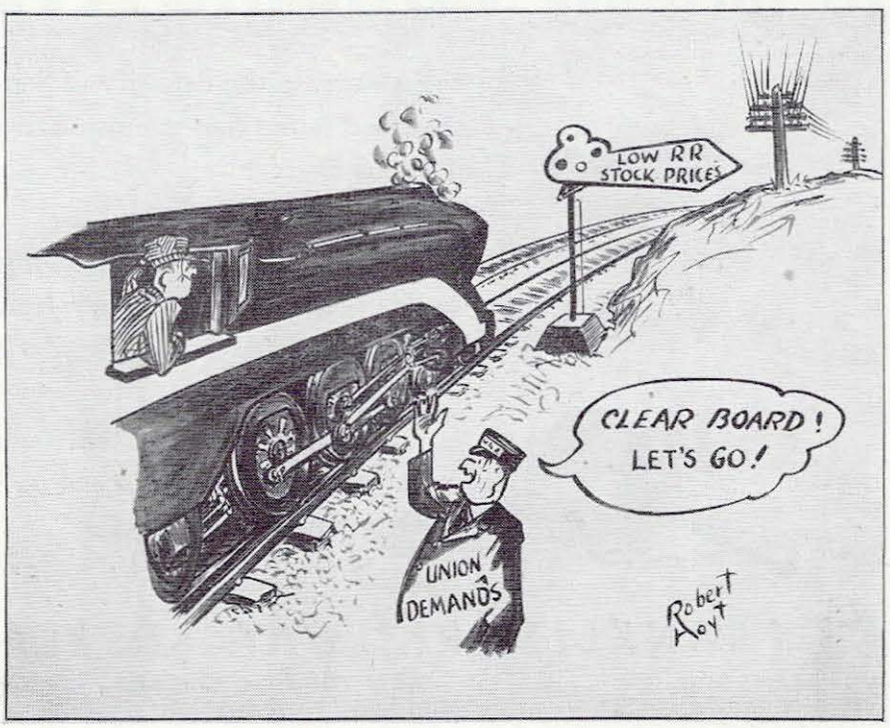
James C. McGohan, whose appointment as assistant freight traffic manager of the Baltimore & Ohio, with headquarters at Baltimore, Md., was announced in the January 26 issue of *Railway Age,* was born on March 2, 1902, at Elizaville, Ky., and began his career in railroading in 1918 as a yard clerk for the B. & O. at Middletown, Ohio. Later that year he was promoted to assistant cashier there, and subsequently advanced to rate clerk at Cincinnati, Ohio, in 1921, then to commerce agent in 1927, and to assistant general freight agent in 1932, both at Cincinnati.

James C. McGohan

Mr. McGohan became general freight agent at Baltimore in 1937, continuing in that position until his promotion in January.

Charles Fendrych, division passenger agent of the New York Central with headquarters at Albany, N. Y., has been advanced to general passenger agent of the Pittsburgh & Lake Erie (part of the New York Central System), with headquarters at Pittsburgh, Pa., succeeding **Edwin E. Smith,** who retired on March 1 after 53

* * *



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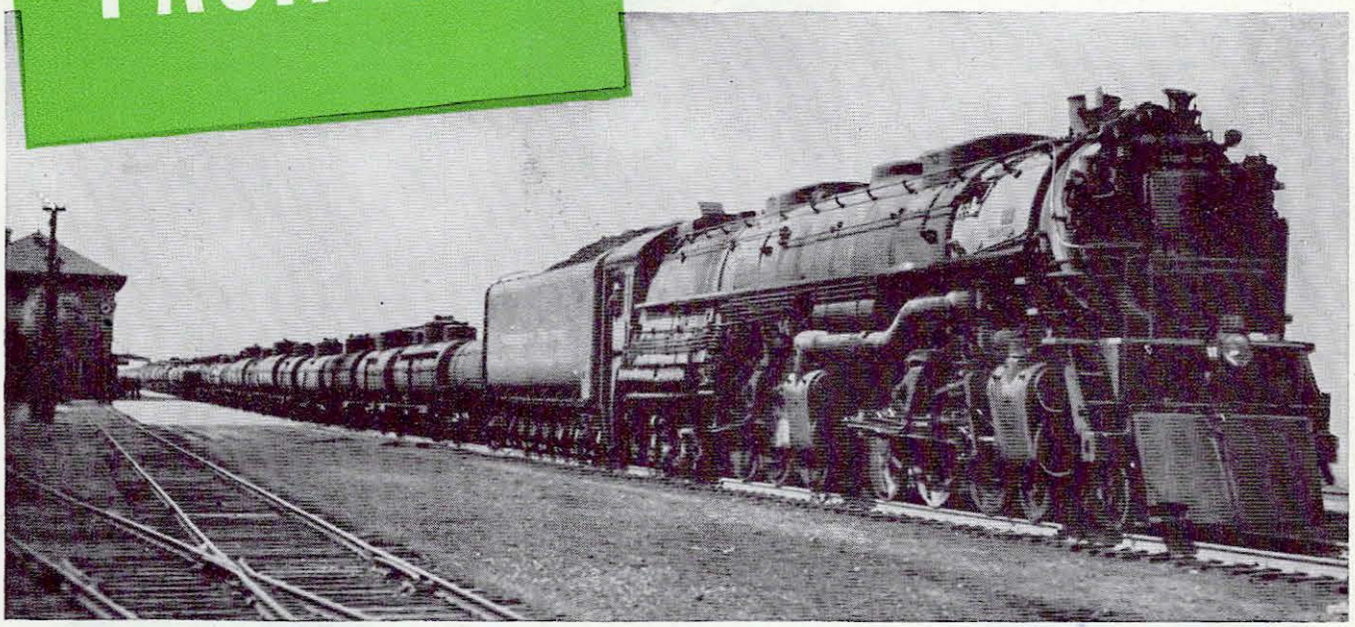
NORTHERN PACIFIC'S TWENTY-SIX 4-6-6-4s

(CLASS Z-7 and Z-8)



are equipped with

8 Security Circulators each

Eight Security Circulators, in the firebox of each Class Z-7 and Z-8 Northern Pacific 4-6-6-4, aid in maintaining top efficiency in the performance of these giant locomotives.

The Circulators improve the circulation of water over the crown sheet and in the side waterlegs, and reduce honeycombing, flue plugging and cinder cutting.

They also permit the use of a 100% arch, and lengthen the life of the arch brick.

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SECURITY CIRCULATOR DIVISION

years of service. **T. R. Ruth,** division passenger agent at Syracuse, N. Y., has been transferred to succeed Mr. Fendrych at Albany. **T. E. Smith** has been appointed division passenger agent at Syracuse, succeeding Mr. Ruth.

H. H. Wentzel, general agent of the Duluth, South Shore & Atlantic, at Detroit, Mich., has been promoted to assistant general freight agent, with the same headquarters. **H. J. Furness** has been appointed general agent at Detroit, succeeding Mr. Wentzel. The position of general freight agent at the Detroit office has been abolished.

Paul D. Freer, whose retirement as freight traffic manager of the Baltimore & Ohio, with headquarters at Baltimore, Md., was reported in the January 26 issue of *Railway Age,* was born in Newark, N. J., and entered railway service in 1891 as a stenographer for the Cincinnati, New Orleans & Texas Pacific, joining the B. & O. in that capacity in 1892, with headquarters at Cincinnati, Ohio. He served in various clerical capacities there and at St. Louis, Mo., until 1913, when he was appointed division freight agent of the

Paul D. Freer

Cincinnati, Hamilton & Dayton (now part of the B. & O.) at Dayton, Ohio, transferring to Chillicothe, Ohio, in 1915, in the joint service of the C. H. & D. and the B. & O. Southwestern (part of B. & O.), then transferring again to Cincinnati in 1916. Mr. Freer was advanced to assistant general freight agent of the B. & O. at Cincinnati in 1919, then to general freight agent there in 1920, and to freight traffic manager, Southwestern region, in 1932. In 1933, he was promoted to freight traffic manager, the position from which he retired in January.

L. A. Moore, formerly division passenger agent of the Missouri-Kansas-Texas, at Ft. Worth, Tex., who has recently been discharged from the armed forces, has returned to the Katy and has been promoted to general agent, freight department, with headquarters at Chicago. **Gilbert J. White,** division freight agent at Kansas City, Mo., has been advanced to general agent, with headquarters at San Francisco, Cal.

ENGINEERING & SIGNALING

L. R. Lamport, whose promotion to engineer of maintenance on the Chicago & North Western, with headquarters at Chicago, was reported in the *Railway Age* of March 9, was born in Chicago on September 29, 1899, and was graduated from the University of Illinois in 1923. He

L. R. Lamport

entered railway service between terms of school in June, 1920, as a rodman on the North Western at Chadron, Neb., later serving during summer vacations and after graduation as tapeman, rodman, instrumentman and inspector. In March, 1925, he went with the Illinois Central, as a rodman on location and maintenance, and in September, 1927, he returned to the North Western as an engineering accountant at Chicago. Mr. Lamport was promoted to assistant engineer on the Galena division in November, 1928, and in September, 1937, he was appointed supervisor of work equipment, with headquarters as before at Chicago. On April 1, 1940, he was promoted to division engineer of the Northern Iowa and Sioux City divisions with headquarters at Sioux City, Iowa, and on December 1, 1940, he was transferred to the Galena division at Chicago. In March, 1943, he was advanced to assistant to the chief engineer, the position he held at the time of his recent promotion.

R. E. Copper, acting chief engineer of the Peoria & Pekin Union, has been appointed chief engineer, with headquarters as before at Peoria, Ill., succeeding **E. H. Thornberry,** who has retired.

W. W. Gwathmey, Jr., regional engineer of the Eastern region of the Baltimore & Ohio, with headquarters at Baltimore, Md., has been appointed engineer of construction there, succeeding **Richard Mather,** who has retired after 34 years of service. **J. W. Jones,** senior assistant engineer at Baltimore, succeeds Mr. Gwathmey as regional engineer there.

F. J. Bishop, whose appointment as chief engineer of the Akron, Canton & Youngstown, with headquarters at Akron, Ohio, was announced in the March 2 issue of *Railway Age,* was born at Sault Ste. Marie, Mich., on May 27, 1894, and was graduated from the University of Michigan, (B. S. in civil engineering). He entered railway service in 1917 with the Lake Superior & Ishpeming as assistant engineer, then joined the Ann Arbor in 1922 as assistant chief engineer, advancing to engineer maintenance of way and then to chief engineer. He went with the Toledo Terminal Railroad in 1927, serving as engineer, signaling, bridges and buildings until 1933, when he was appointed engineer maintenance of way. Mr. Bishop held the latter post until his appointment as chief engineer of the Akron, Canton & Youngstown, effective on February 18.

E. C. Vandenburgh, whose promotion to chief engineer of the Chicago & North Western, with headquarters at Chicago, was reported in the *Railway Age* of March 9, was born in Audubon, Iowa, on March 26, 1887, and was graduated from Iowa State College in 1908. He entered railway service on July 1, 1908, as a chainman in the Engineering department of the North Western, later serving as a rodman, draftsman and instrumentman on location, construction and maintenance. On October 7, 1912, he was transferred to the signal department as an inspector and a year later he was advanced to chief draftsman in the same department. From July 11, 1914, to January 1, 1916, Mr. Vandenburgh

E. C. Vandenburgh

served as assistant engineer on construction, returning to the signal department as assistant engineer on the latter date. Two years later he was appointed assistant general bridge inspector, which position he retained until April 7, 1924, when he was promoted to supervisor of bridges and buildings of the Madison division, with headquarters at Madison, Wis. On May 1, 1931, he was advanced to division engineer of the Northern Iowa and Sioux City divisions, with headquarters at Sioux City, Iowa, and on April 1, 1940, he was further advanced to engineer of maintenance at Chicago, the position he held at the time of his recent promotion.

MECHANICAL

Lewis A. McAllister, whose appointment to mechanical engineer of the Alton, with headquarters at Chicago, was reported in the *Railway Age* of March 2, was born at Great Falls, Mont., on March 20, 1903, and is a graduate of Purdue University. He entered railway service on July 1, 1926, as a special apprentice on the Chicago, Milwaukee, St. Paul & Pacific, at Min-

News Department continued on next left-hand page

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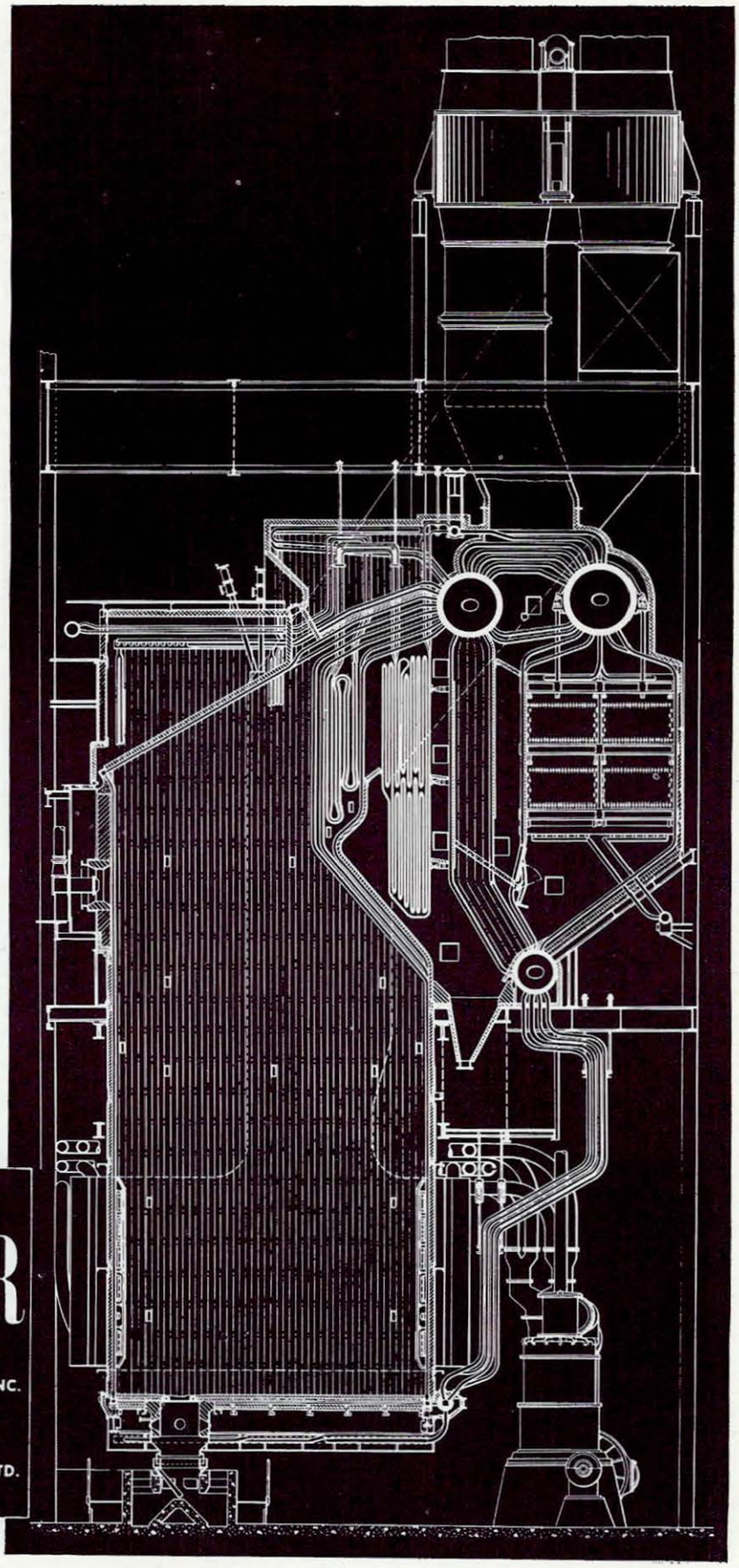

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neapolis, Minn., and two years later he was transferred to Milwaukee, Wis. For a short time Mr. McAllister left the railroad to serve in the employ of the A. O. Smith Corporation at Milwaukee. He returned to the Milwaukee on February 1, 1930, as a mechanical inspector in charge of a dynamometer car, resigning to accept his new position with the Alton.

Alden B. Lawson, whose appointment as mechanical engineer of the Baltimore & Ohio, with headquarters at Baltimore, Md., was announced in the *Railway Age* of January 26, was born in Somerset County, Md., on December 16, 1887, and entered

Alden B. Lawson

railroading in 1909 as a junior engineering draftsman for the B. & O. He was promoted to engineering draftsman in the locomotive department in 1910, and transferred to the passenger car department in 1918, where he became leading engineering draftsman, in charge of design and development, in 1919. In 1927, Mr. Lawson was advanced to assistant engineer, passenger car department, in charge of design and development, and in 1942, chief engineering draftsman in charge of design and development of locomotives, freight and passenger equipment cars and shops. His promotion to mechanical engineer became effective on January 1.

John T. Daley, master mechanic of the Alton and Southern, has been promoted to superintendent of motive power, with headquarters as before at East St. Louis, Ill., succeeding **J. W. Coulter,** who has retired after more than 40 years of service. **H. E. Wagner,** master car builder, has been advanced to superintendent of the car department. The positions of master mechanic and master car builder have been abolished.

SPECIAL

Byron S. Harvey, Jr., whose election to the presidency of Fred Harvey, with headquarters at Chicago, was reported in the *Railway Age* of March 2, was born at Chicago on February 25, 1903, and received

Byron S. Harvey, Jr.

his higher education at Stanford University. He began his business career in 1927 by working in the wholesale division of a Chicago department store and later as a salesman. In 1928 he went with the Harvey organization as a retail sales clerk of the drug store in Chicago's Union Station. A short time later he was advanced to buyer of men's furnishings, eventually becoming merchandising manager of the company's commercial division. In 1936 Mr. Harvey was elected a vice-president in charge of retail sales, sales promotion and advertising, the position he held at the time of his election to the presidency.

E. Mason Brown, whose promotion to chief special agent of the Gulf, Mobile & Ohio, with headquarters at Mobile, Ala., was reported in the *Railway Age* of March 2, was born at Jackson, Tenn., on March

E. Mason Brown

21, 1908, and entered railway service on June 1, 1926, as a clerk on the Gulf, Mobile & Northern (now the G. M. & O.) at Jackson. On November 1, 1931, he was promoted to special agent in the special agent's department, with the same headquarters, and in September, 1940, he entered the armed forces, being discharged on December 19, 1945, with the rank of lieutenant-colonel. He later returned to the G. M. & O., and was then advanced to his new position.

* * *

Originally one of the B. & O.'s Colonial diners, built in 1923, this diner has been modernized by the railroad to the cocktail room type. It has been given Dalite window blinds, colorful side wall paneling and carpeting, plus fluorescent lighting

OBITUARY

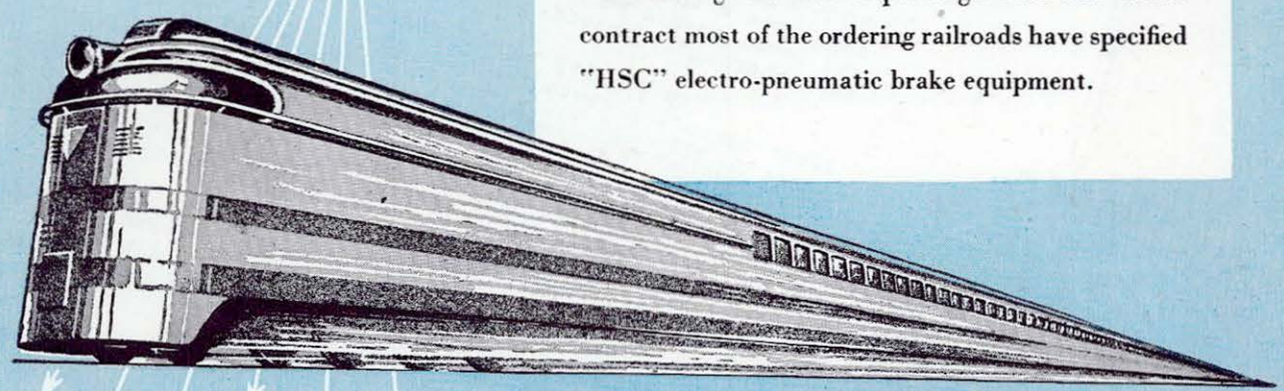
Roy D. Garner, general manager and chief engineer of the Central Vermont (part of the Canadian National), with headquarters at St. Albans, Vt., died on March 9, having resigned a few days previously, due to ill health. His retirement became effective on March 8, completing a railway career of more than 40 years.

Shelton Pitney, co-trustee of the Central of New Jersey, whose death at Morristown, N. J., was announced in the January 19 issue of *Railway Age,* was born there on March 29, 1893, and was graduated from Princeton (A. B., 1914) and from Harvard Law School in 1917. Mr. Pitney served overseas in World War I as a captain in the field artillery, then resumed civil life with the firm of Cravath & Henderson, New York. He became a partner in the Newark, N. J., firm now known as Pitney, Hardin, Ward & Brennan in 1922. In December, 1939, Mr. Pitney and W. P. Gardner were appointed trustees of the Central of New Jersey.

How will Atomic Power affect "HSC" Brakes for Passenger Trains?

Your guess is as good as ours! But there is no guessing about the immediate future. The "HSC" electro-pneumatic brake is a development through a decade of actual operation. It has the necessary elements for safe and smooth operation of passenger trains. It is just as much a part of the modern passenger car as beautiful finish and luxurious appointments. Though "sight unseen" its smooth handling is the soothing touch to passenger comfort.

For the large number of passenger cars now under contract most of the ordering railroads have specified "HSC" electro-pneumatic brake equipment.



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HUNT-SPILLER MANUFACTURING CORPORATION

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Are *Double-Heading* it with a Complete DIESEL PISTON RING SERVICE

NEW, FASTER SERVICE

HUNT-SPILLER knows railroad needs and problems. The DOUBLE SEAL RING COMPANY have 34 years of specialized Diesel piston ring experience behind them. *Together* they give you faster, better piston ring service than ever before . . . service in step with today's fast-moving railroad progress.

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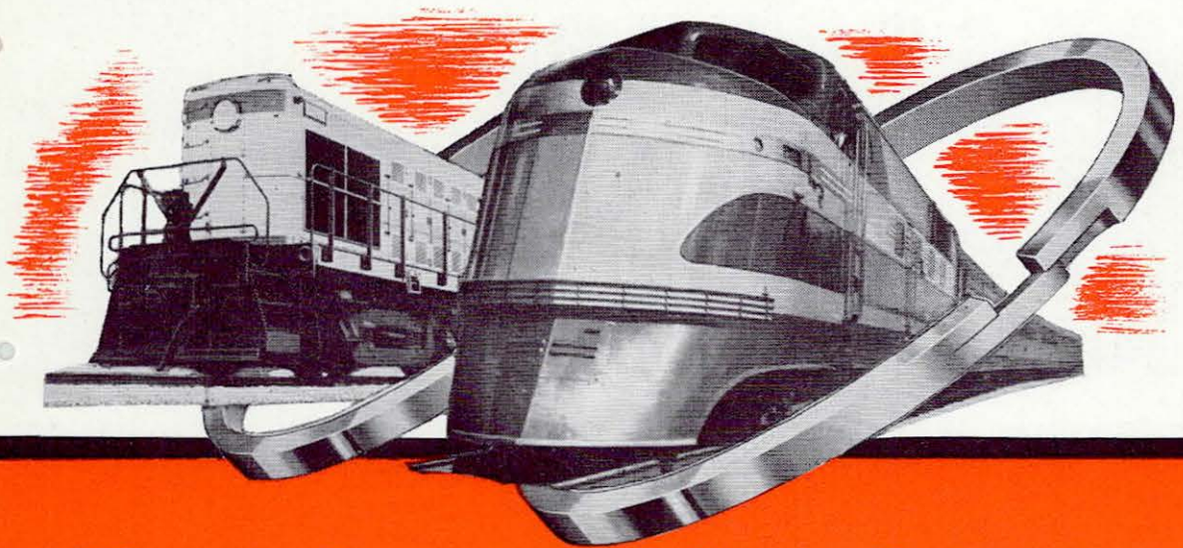

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REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY OF CALENDAR YEAR 1946

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Railway tax accruals	Net railway operating income: 1946	1945
Akron, Canton & Youngstown	Jan.	171	$304,514	$195	$321,550	$54,498	$37,396	$19,497	$108,211	$237,598	73.9	$83,952	$30,766	$37,908	$76,914
Alton	Jan.	959	1,429,850	699,729	2,436,110	346,001	450,982	66,888	1,023,010	2,017,386	82.8	418,724	167,872	172,259	211,640
Atchison, Topeka & Santa Fe	Jan.	13,085	23,691,740	9,899,941	36,225,789	4,386,732	5,849,655	639,667	11,770,374	23,302,229	64.3	12,923,560	6,096,771	6,613,820	4,828,082
Atlanta & West Point	Jan.	93	186,104	99,583	325,852	42,738	51,320	12,489	173,412	301,185	92.4	24,667	*1,078	7,046	31,343
Western of Alabama	Jan.	133	194,414	112,767	338,043	59,780	61,177	11,783	147,478	300,002	88.7	38,041	16,973	24,345	42,045
Atlanta, Birmingham & Coast	Jan.	Included in Atlantic Coast Line													
Atlantic Coast Line	Jan.	5,569	7,426,457	3,056,816	11,312,646	2,329,611	1,909,213	240,291	4,123,509	9,063,818	80.1	2,248,828	1,000,000	917,919	987,262
Charleston & Western Carolina	Jan.	343	267,348	10,578	287,163	83,005	65,746	10,946	124,726	291,027	101.3	—3,864	20,000	—26,524	45,169
Baltimore & Ohio	Jan.	6,139	19,871,667	4,194,153	25,526,217	3,505,076	6,247,298	450,123	10,819,961	22,222,132	87.1	3,304,085	1,588,956	1,258,204	3,419,518
Staten Island Rapid Transit	Jan.	29	122,658	115,829	250,095	38,902	38,728	1,959	145,837	247,042	98.8	3,053	36,490	—53,493	67,857
Bangor & Aroostook	Jan.	602	1,162,753	58,281	1,249,540	210,983	194,561	5,826	352,352	799,632	64.0	449,908	183,036	235,449	136,150
Bessemer & Lake Erie	Jan.	214	548,476	1,868	561,434	104,550	365,963	12,646	237,365	761,910	135.7	—200,476	46,787	58,412	—236,106
Boston & Maine	Jan.	1,764	4,380,552	1,412,372	6,334,042	1,013,023	996,202	79,733	2,637,733	4,988,550	78.8	1,345,492	585,209	489,372	142,759
Burlington, Rock Island	Jan.	228	160,817	62,066	245,457	32,476	24,471	3,410	94,780	171,962	70.1	73,495	9,148	21,731	40,154
Cambria & Indiana	Jan.	35	151,030	.....	151,087	9,496	48,395	631	21,255	87,816	58.1	63,271	69,981	87,295	47,862
Canadian Pacific Lines in Maine	Jan.	234	486,411	97,214	618,865	61,239	90,438	6,994	220,522	390,677	63.1	228,188	23,213	103,157	167,310
Canadian Pacific Lines in Vermont	Jan.	90	85,619	19,708	126,096	26,855	35,519	2,530	119,718	189,624	150.4	—63,528	9,390	—112,051	—125,331
Central of Georgia	Jan.	1,815	1,904,128	584,195	2,780,560	444,978	464,776	84,879	1,204,525	2,342,852	84.3	437,708	191,976	262,176	512,013
Central of New Jersey	Jan.	649	3,082,721	564,979	3,970,419	479,112	842,013	65,430	2,074,252	3,654,704	92.0	315,715	383,671	—193,658	134,993
Central of Vermont	Jan.	422	495,372	90,000	636,937	92,214	116,935	9,766	360,959	606,369	95.2	30,568	41,722	—67,198	—121,676
Chesapeake & Ohio	Jan.	3,084	14,178,844	1,807,897	16,526,305	2,398,715	2,649,361	255,702	4,938,733	10,804,865	65.4	5,721,440	2,873,429	3,623,734	2,515,962
Chicago & Eastern Illinois	Jan.	910	1,424,255	480,753	2,124,798	321,058	462,720	71,432	878,970	1,845,559	86.9	279,239	133,200	29,874	202,952
Chicago & Illinois Midland	Jan.	131	483,358	965	504,083	45,629	103,752	28,600	155,262	360,501	71.5	143,582	67,021	77,214	70,681
Chicago & North Western	Jan.	8,065	8,100,841	3,348,737	12,943,744	1,906,263	2,691,320	235,532	5,521,928	10,909,529	84.3	2,034,215	932,137	854,296	1,526,526
Chicago, Burlington & Quincy	Jan.	8,863	13,437,018	4,638,556	19,906,529	1,931,878	2,170,631	271,524	5,472,473	10,465,511	52.6	9,441,018	3,818,431	5,194,619	3,699,712
Chicago Great Western	Jan.	1,500	1,864,357	236,793	2,339,318	436,413	344,104	75,026	1,080,988	2,014,616	86.1	324,702	137,859	—33,796	236,563
Chicago, Indianapolis & Louisville	Jan.	541	684,171	62,418	794,960	88,508	167,323	31,812	326,352	659,479	83.0	135,481	54,047	18,629	227,647
Chicago, Milwaukee, St. Paul & Pacific	Jan.	10,733	12,836,317	3,547,898	18,164,797	2,105,528	2,960,199	269,040	7,172,351	13,265,905	73.0	4,898,892	2,124,000	2,203,988	2,538,535
Chicago, Rock Island & Pacific	Jan.	7,656	9,727,764	3,408,645	14,376,792	1,578,147	2,171,605	368,178	5,020,717	9,786,754	68.1	4,590,038	1,360,989	2,560,755	2,322,122
Chicago, St. Paul, Minneapolis & Omaha	Jan.	1,617	1,718,543	320,551	2,251,045	327,910	359,536	42,160	1,134,916	1,951,112	86.7	299,933	153,737	6,317	213,711
Clinchfield Railroad	Jan.	302	1,038,609	8,542	1,057,873	97,551	150,877	23,395	302,311	595,972	56.3	461,901	135,036	355,929	536,058
Colorado & Southern	Jan.	748	612,868	224,450	939,128	173,567	177,582	17,824	379,594	795,894	84.8	143,234	70,522	46,374	176,379
Fort Worth & Denver City	Jan.	804	550,054	371,394	1,026,647	189,219	146,873	27,797	332,270	756,201	73.7	270,446	121,242	127,766	116,115
Colorado & Wyoming	Jan.	42	65,602	.....	101,143	8,540	14,782	724	34,636	63,848	63.1	37,295	19,705	16,744	28,748
Columbus & Greenville	Jan.	168	117,140	7,176	133,429	27,675	22,729	5,558	49,341	120,102	90.0	13,327	13,459	709	21,182
Delaware & Hudson	Jan.	846	3,367,726	186,769	3,647,801	436,650	836,157	49,640	1,433,047	2,880,985	79.0	766,816	369,593	422,649	309,597
Delaware, Lackawanna & Western	Jan.	973	4,119,158	908,522	5,543,084	541,737	952,892	117,831	2,606,405	4,407,392	79.5	1,135,782	538,900	567,926	—156,543
Denver & Rio Grande Western	Jan.	2,386	3,206,469	1,309,433	4,772,068	464,502	971,808	105,356	1,857,366	3,613,866	75.7	1,158,202	356,750	705,247	1,012,664
Denver & Salt Lake	Jan.	232	308,575	10,049	331,062	45,078	58,381	3,751	131,264	252,069	76.1	78,993	31,660	86,422	91,217
Detroit & Mackinac	Jan.	230	91,373	4,791	103,598	14,285	15,130	945	35,043	70,052	67.6	33,546	4,261	22,831	584
Detroit & Toledo Shore Line	Jan.	50	360,822	.....	362,596	30,880	25,525	9,424	112,126	186,583	51.5	176,013	59,878	52,469	62,865
Detroit, Toledo & Ironton	Jan.	464	887,630	1,114	939,759	98,840	147,600	16,401	252,106	541,786	57.7	397,973	150,328	195,447	233,001
Duluth, Missabe & Iron Range	Jan.	546	98,415	5,966	133,718	314,591	333,830	4,716	279,988	975,166	729.3	—841,448	47,879	—905,536	—1,043,961
Duluth, Winnipeg & Pacific	Jan.	175	247,000	1,700	253,300	31,857	31,646	2,598	107,489	178,112	70.3	75,188	19,880	24,641	2,560
Elgin, Joliet & Eastern	Jan.	392	1,657,743	101	1,846,311	202,270	400,104	17,892	882,566	1,591,218	86.2	255,093	148,211	—30,034	469,401

* Cr.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY OF CALENDAR YEAR 1946

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures	Maintenance of Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Railway tax accruals	Net railway operating income 1946	Net railway operating income 1945
Erie	Jan.	2,242	$8,594,634	$983,148	$10,242,641	$855,257	$1,750,416	$229,131	$4,707,665	$8,044,844	78.5	$2,197,797	$911,158	$807,121	$804,644
Florida East Coast	Jan.	682	1,581,617	939,310	2,750,202	311,029	329,020	54,015	795,022	1,623,581	59.0	1,126,621	340,673	688,450	773,309
Georgia Railroad	Jan.	329	468,685	111,182	616,375	101,210	132,230	24,598	344,939	628,428	102.0	—12,053	37,721	—38,713	230,617
Georgia & Florida	Jan.	408	180,932	3,469	189,385	47,621	27,232	10,728	74,648	168,286	88.9	21,099	12,041	—2,155	11,278
Grand Trunk Western	Jan.	1,026	2,001,000	307,000	2,477,000	458,115	530,155	41,212	1,237,372	2,382,074	96.2	94,926	171,647	—140,184	446,601
Canadian National Lines in New England	Jan.	172	146,800	8,000	187,000	53,970	48,627	2,272	76,821	202,714	108.4	—15,714	21,716	—67,298	—102,480
Great Northern	Jan.	8,332	9,312,945	2,052,712	12,417,385	2,062,427	2,536,407	246,668	4,723,813	10,046,515	80.9	2,370,870	1,366,152	1,039,234	1,337,350
Green Bay & Western	Jan.	234	232,071	272	236,818	40,960	24,122	12,303	91,302	179,869	75.9	56,949	25,999	19,788	28,074
Gulf & Ship Island	Jan.	Included in Illinois Central													
Gulf, Mobile & Ohio	Jan.	1,945	2,531,859	210,129	2,845,353	518,728	500,419	74,342	931,012	2,146,346	75.43	699.007	293,191	256,601	312,953
Illinois Central	Jan.	5,081	10,846,189	2,591,750	14,512,518	2,184,911	2,613,314	245,657	5,546,473	11,346,374	78.2	3,166,144	1,589,089	1,482,858	2,143,441
Yazoo & Mississippi Valley	Jan.	1,524	1,405,817	291,213	1,808,702	445,878	247,520	36,843	858,352	1,671,918	92.4	136,784	208,223	—144,502	328,542
Illinois Central System	Jan.	6,605	12,252,006	2,882,962	16,321,220	2,630,789	2,860,834	282,500	6,404,825	13,018,292	79.8	3,302,928	1,801,601	1,342,269	2,476,896
Illinois Terminal	Jan.	476	541,628	141,780	754,275	107,736	104,620	21,327	282,419	542,718	71.95	211,557	95,924	99,430	119,595
Kansas City Southern	Jan.	890	1,842,871	223,131	2,250,931	258,028	307,976	66,482	776,248	1,529,031	67.9	721,900	185,000	423,522	547,265
Kansas, Oklahoma & Gulf	Jan.	328	312,992	1,886	318,788	22,995	26,913	11,595	80,373	155,006	48.6	163,782	63,133	78,941	76,860
Lake Superior & Ishpeming	Jan.	156	43,833	85	46,765	26,447	42,142	821	31,499	109,986	235.19	—63,221	22,935	—80,482	—81,218
Lehigh & Hudson River	Jan.	96	199,854	.....	200,526	26,275	34,254	5,470	69,165	142,742	71.2	57,784	26,814	17,640	16,794
Lehigh & New England	Jan.	190	439,719	.....	442,243	48,475	88,153	11,005	160,356	328,211	74.2	114,032	63,121	77,265	39,636
Lehigh Valley	Jan.	1,254	4,449,305	717,932	5,618,797	534,056	831,667	116,348	2,540,383	4,231,329	75.3	1,387,468	528,812	643,288	—276,810
Louisiana & Arkansas	Jan.	757	898,692	120,046	1,061,746	146,165	154,346	34,256	346,531	728,884	68.6	332,862	118,827	154,663	220,653
Louisville & Nashville	Jan.	4,758	11,060,274	2,415,940	14,459,915	1,803,699	2,725,724	213,496	5,432,734	10,711,580	74.1	3,748,335	2,095,720	2,141,630	2,168,729
Maine Central	Jan.	988	1,543,991	204,592	1,866,027	284,388	321,214	13,256	757,330	1,427,389	76.5	438,638	164,837	150,520	83,994
Midland Valley	Jan.	334	134,038	22	136,252	20,279	12,402	2,698	47,440	88,445	64.9	47,807	23,983	16,623	18,919
Minneapolis & St. Louis	Jan.	1,408	1,101,801	72,512	1,225,521	234,948	199,252	84,517	446,349	1,024,179	83.6	201,342	105,768	63,835	132,277
Minneapolis, St. Paul & Sault Ste. Marie	Jan.	3,224	1,612,654	156,252	1,923,609	356,680	359,618	42,461	938,870	1,772,696	92.2	150,913	154,792	—18,733	—45,931
Duluth, South Shore & Atlantic	Jan.	530	278,081	16,306	312,770	57,099	57,434	12,386	145,245	280,374	89.6	32,396	19,403	11,413	4,511
Spokane International	Jan.	152	93,079	2,923	103,688	16,983	12,180	2,811	38,863	77,124	74.4	26,564	9,533	10,937	23,590
Mississippi Central	Jan.	158	105,224	10,455	118,964	29,620	17,361	9,404	36,379	100,092	84.1	18,872	7,875	—1,924	25,508
Missouri & Arkansas	Jan.	365	116,170	2,121	131,653	43,079	24,114	7,903	64,473	145,704	110.7	—14,051	6,299	—35,395	4,263
Missouri-Illinois	Jan.	172	229,414	436	231,206	33,084	29,099	4,894	66,918	141,537	61.2	89,669	42,325	45,877	34,599
Missouri-Kansas-Texas Lines	Jan.	3,253	3,778,362	851,964	5,144,317	846,171	599,343	177,965	1,786,934	3,657,806	71.1	1,486,511	618,452	684,033	660,683
Missouri Pacific	Jan.	7,080	10,427,349	2,471,537	14,171,953	1,736,629	2,452,576	331,161	5,308,794	10,412,561	73.5	3,759,392	1,179,206	2,038,976	3,007,428
Gulf Coast Lines	Jan.	1,734	3,067,115	285,601	3,501,584	461,031	316,585	60,652	925,746	1,856,820	53.03	1,644,764	519,262	831,441	657,144
International-Great Northern	Jan.	1,110	1,455,097	379,259	2,099,503	396,682	303,361	41,169	798,645	1,638,779	78.1	460,724	95,998	209,788	317,545
Monongahela	Jan.	170	601,148	2,197	605,939	64,146	51,062	659	164,975	284,658	47.0	321,281	60,684	158,867	96,719
Montour	Jan.	51	240,728	.....	242,453	16,197	67,025	1,234	83,151	177,309	73.1	65,144	49,066	58,051	40,089
Nashville, Chattanooga & St. Louis	Jan.	1,053	1,712,965	487,204	2,455,456	509,773	488,091	79,918	963,916	2,126,961	86.6	328,495	202,473	143,642	464,413
New York Central	Jan.	10,746	32,943,421	13,320,163	51,112,139	7,954,194	10,661,352	771,297	22,617,959	44,501,335	87.1	6,610,804	4,253,496	998,541	2,465,281
Pittsburgh & Lake Erie	Jan.	229	1,920,385	101,284	2,101,012	381,152	799,617	43,619	924,619	2,266,483	107.9	—165,471	276,241	174,580	256,154
New York, Chicago & St. Louis	Jan.	1,687	5,282,621	329,042	5,754,292	812,308	910,996	163,374	2,234,397	4,331,573	75.3	1,422,719	507,367	577,477	1,336,656
New York, New Haven & Hartford	Jan.	1,838	5,803,057	5,425,756	12,291,747	1,692,689	1,869,289	171,674	5,124,835	9,653,636	78.5	2,638,111	930,000	815,610	1,153,664

Table continued on second left hand page

. . . for main line high speed

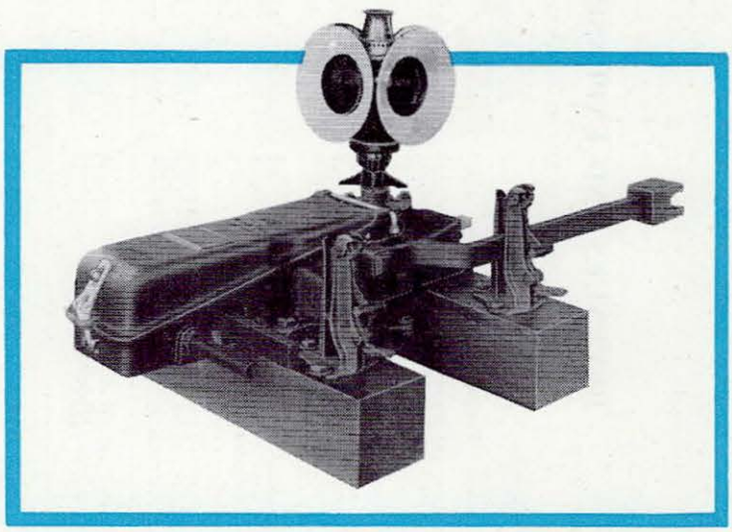
SAFETY

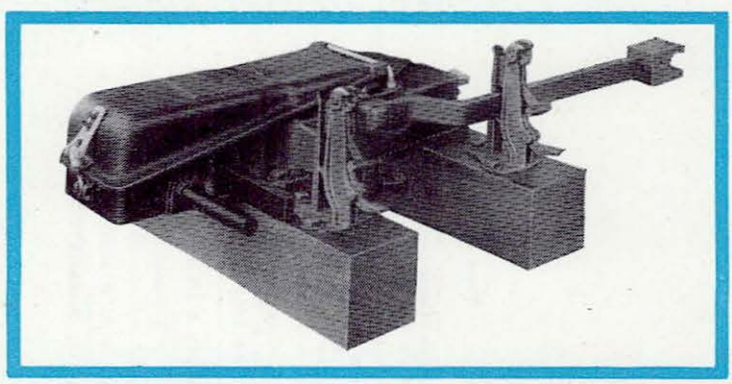
. . . at hand-operated switches with "UNION" Switch Stands

Any *good* switch stand is ruggedly built, designed for maximum clearance between train and switch parts, and fully enclosed against weather and dirt. But, "Union" T-20 and T-21 Switch Stands go much farther than that. These switch stands provide protection equivalent to that of interlocked switches.

1. Their rack and crank assembly, or driving mechanism, is so designed that it positively holds the switch operating rod at the end of the stroke for either the normal or reverse position of the switch.
2. They incorporate a standard lock rod which mechanically locks the switch in its normal position—can be withdrawn from locking position only by lifting the lever out of the latch stand—cannot be affected by thrust forces of passing car wheels.
3. Their point detector continuously checks to determine that the switch points have not been damaged and are correctly positioned.
4. They have a self-contained circuit controller which is operated by the locking and the point detector; and governs the signal indications accordingly.

T-20 and T-21 Switch Stands are identical, except that the latter includes a built-in target-drive assembly. Parts are interchangeable and reversible for right or left hand applications. For complete details, write for Bulletin 156.

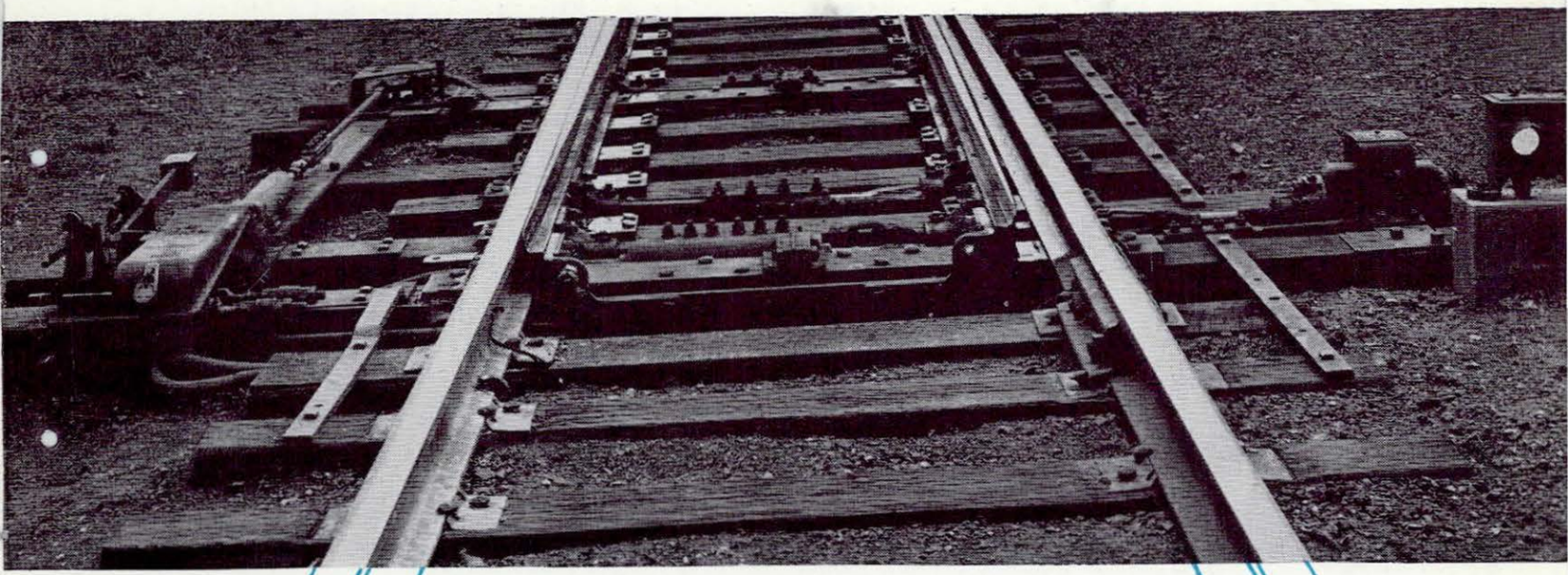




UNION

SWISSVALE,

train movements



. . . at spring switches with "UNION" Mechanical Facing Point Locks

To safeguard the movement of main line traffic at high speed over spring switches, specify "Union" S-20 or S-21 Mechanical Facing Point Locks. With these locks, facing point moves may be made without reduction in speed or decrease in safety.

For facing point moves, the "Union" Mechanical Facing Point Lock prevents opening of the points in case of a broken spring in a spring head rod, or failure of the operating rod; and guards against the shifting of points under trains.

The signal governing facing point traffic is controlled through the circuit controller of the lock mechanism. This controller checks that the switch is correctly positioned and locked; and, through the point detector, continuously checks that the switch points are in the correct position and have not been damaged.

The S-20 and S-21 Mechanical Facing Point Locks are identical, except that the latter has a built-in target drive mechanism. Our nearest district office will be glad to provide full information.

SWITCH & SIGNAL COMPANY

PENNSYLVANIA NEW YORK CHICAGO ST. LOUIS SAN FRANCISCO

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY OF CALENDAR YEAR 1946

Name of road		Av. mileage operated during period	Operating revenues: Freight	Passenger	Total (inc. misc.)	Operating expenses: Maintenance of: Way and structures	Equipment	Traffic	Transportation	Total	Operating ratio	Net from railway operation	Railway tax accruals	Net railway operating income: 1946	1945
New York Connecting	Jan.	21	$169,226	.....	$173,672	$43,766	$9,633	.....	$72,951	$128,116	73.8	$45,556	$59,131	$135,409	$161,944
New York, Ontario & Western	Jan.	547	439,908	4,323	500,358	78,451	97,271	21,955	284,922	511,747	102.3	—11,389	34,395	—109,060	—275,361
New York, Susquehanna & Western	Jan.	120	323,813	43,729	382,979	30,617	33,305	4,078	157,304	243,248	63.5	139,731	39,295	28,879	13,038
Norfolk & Western	Jan.	2,161	10,563,351	1,172,515	12,057,182	1,397,308	2,171,073	178,972	3,157,195	7,264,200	60.2	4,792,982	2,523,089	3,177,040	2,085,442
Norfolk Southern	Jan.	727	587,150	12,862	621,015	138,901	72,264	32,389	223,051	497,756	80.2	123,259	48,864	48,548	39,793
Northern Pacific	Jan.	6,872	7,788,177	2,027,381	10,844,170	1,715,280	1,973,418	181,420	4,009,090	8,479,843	78.2	2,364,327	1,285,807	1,539,553	1,659,079
Northwestern Pacific	Jan.	331	319,418	275	339,653	170,797	58,285	2,463	202,526	442,333	130.2	—102,680	27,646	—164,863	90,576
Oklahoma City-Ada-Atoka	Jan.	132	92,341	.....	102,444	18,093	4,966	1,117	25,332	52,604	51.4	49,840	13,994	17,653	23,594
Pennsylvania	Jan.	10,121	41,864,578	21,122,250	68,462,415	6,779,860	14,434,397	1,001,037	31,463,689	56,674,770	82.8	11,787,645	5,528,892	6,237,713	6,591,513
Long Island	Jan.	376	1,042,983	2,103,190	3,335,567	386,005	481,195	23,865	1,703,393	2,669,774	80.0	665,793	258,921	148,999	—47,576
Pennsylvania-Reading Seashore Lines	Jan.	390	374,925	199,892	597,648	189,907	106,537	7,122	446,166	772,836	129.3	—175,188	72,612	—340,926	—255,280
Pere Marquette	Jan.	1,949	3,329,854	243,673	3,752,547	565,054	738,983	85,022	1,582,116	3,139,022	83.7	613,525	311,681	215,750	419,398
Pittsburg & Shawmut	Jan.	97	142,540	.....	143,260	18,119	24,789	1,724	43,300	93,938	65.6	49,322	4,427	39,759	21,357
Pittsburgh & West Virginia	Jan.	136	320,534	.....	341,892	65,393	89,576	25,850	121,102	328,945	96.2	12,947	27,082	18,402	197,804
Pittsburg, Shawmut & Northern	Jan.	190	89,745	.....	90,462	17,556	15,658	1,009	43,694	84,740	93.7	5,722	5,892	—7,661	—16,993
Reading	Jan.	1,362	6,948,408	1,180,494	8,530,436	1,207,882	1,644,288	90,379	3,556,453	6,735,617	79.0	1,794,819	815,325	761,106	1,092,332
Richmond, Fredericksburg & Potomac	Jan.	118	1,133,684	1,118,864	2,434,800	284,423	276,154	14,410	756,909	1,439,599	59.1	995,201	427,668	456,128	208,504
Rutland	Jan.	407	306,373	47,996	414,990	71,162	95,127	12,451	245,855	441,916	106.5	—26,926	27,389	—55,448	—137,382
St. Louis-San Francisco	Jan.	4,645	5,537,530	1,642,666	7,888,944	1,374,850	1,666,428	177,389	3,084,064	6,672,796	84.6	1,216,148	511,499	779,498	1,412,924
St. Louis, San Francisco & Texas	Jan.	160	283,078	27,827	320,494	33,767	33,996	11,532	106,552	193,585	60.4	126,909	11,895	88,895	19,413
St. Louis Southwestern Lines	Jan.	1,576	3,388,092	220,076	3,751,105	1,048,470	562,290	106,242	1,121,006	2,989,169	79.7	761,936	272,773	338,767	923,010
Seaboard Air Line	Jan.	4,150	6,775,577	2,638,816	10,134,859	1,325,589	1,539,193	243,212	3,504,829	7,063,763	69.7	3,071,096	956,863	1,734,411	1,787,741
Southern Railway	Jan.	6,484	12,799,125	3,974,503	18,093,163	2,577,363	3,060,251	294,425	6,334,839	12,953,816	71.6	5,139,347	2,165,904	2,656,690	2,578,525
Alabama Great Southern	Jan.	315	796,771	351,460	1,245,867	191,472	271,114	25,607	409,593	964,608	77.4	281,259	160,225	103,597	234,765
Cincinnati, New Orleans & Texas Pacific	Jan.	337	1,714,788	435,395	2,295,543	309,934	573,214	38,125	740,271	1,754,695	76.4	540,848	276,450	302,368	381,840
Georgia Southern & Florida	Jan.	397	291,490	143,854	483,523	94,140	62,845	5,687	168,892	348,744	72.1	134,779	49,897	57,665	70,195
New Orleans & Northeastern	Jan.	204	526,066	166,458	746,502	117,122	83,183	13,192	193,041	451,487	60.5	295,015	121,733	105,038	155,050
Southern Pacific	Jan.	8,247	21,382,725	8,429,825	33,126,687	4,505,623	6,729,139	655,617	12,068,865	26,130,469	78.9	6,996,218	2,906,754	2,973,227	2,953,189
Texas & New Orleans	Jan.	4,322	6,191,864	1,987,340	8,837,665	1,280,687	1,219,272	155,296	2,733,587	5,799,649	65.6	3,038,016	1,198,117	1,428,471	1,117,820
Spokane, Portland & Seattle	Jan.	944	1,085,987	155,710	1,357,884	345,454	172,684	14,595	569,182	1,169,102	86.1	188,782	126,794	—37,691	332,908
Tennessee Central	Jan.	286	222,649	23,700	263,927	55,526	52,797	6,749	126,692	256,552	97.2	7,375	21,178	—29,164	42,541
Texas & Pacific	Jan.	1,874	2,765,137	1,266,404	4,527,248	592,345	624,271	121,083	1,515,654	3,131,784	69.2	1,395,464	439,042	789,014	754,367
Texas Mexican	Jan.	162	149,959	322	171,054	30,084	15,294	3,505	46,208	104,944	.....	66,110	18,484	34,936	—62,650
Toledo, Peoria & Western	Jan.	.....	Dr. 5,061	Dr. 8	Dr. 5,069	68	225	14	3,923	8,764	.....	13,833	80	—13,913	197,603
Union Pacific System	Jan.	9,777	20,716,864	7,697,439	31,526,034	3,808,952	5,693,404	558,798	10,588,116	22,490,042	71.3	9,035,992	4,340,484	3,875,161	2,844,205
Utah	Jan.	111	171,209	.....	171,425	20,510	49,310	670	58,227	133,525	77.9	37,900	18,611	16,905	17,097
Virginian	Jan.	661	2,449,656	7,718	2,538,168	288,710	620,239	30,748	554,921	1,554,605	61.2	983,563	491,000	650,066	579,608
Wabash	Jan.	2,393	4,951,591	784,592	6,184,693	777,774	913,196	184,782	2,559,618	4,701,041	76.0	1,483,652	607,520	614,360	705,345
Ann Arbor	Jan.	294	451,715	7,586	468,453	49,939	86,427	17,371	228,343	394,550	84.2	73,903	38,333	33,049	30,986
Western Maryland	Jan.	839	2,523,968	62,042	2,695,874	292,510	460,558	54,832	874,370	1,789,557	66.4	906,317	375,000	573,900	585,824
Western Pacific	Jan.	1,195	2,853,005	992,306	3,982,282	586,944	579,155	101,144	1,166,907	2,603,485	65.4	1,378,797	546,423	678,171	591,716
Wheeling & Lake Erie	Jan.	505	1,549,857	4	1,590,470	179,376	321,333	46,065	556,517	1,156,336	72.7	434,134	311,858	316,421	283,382
Wisconsin Central	Jan.	1,150	1,503,822	98,119	1,757,602	203,111	264,169	44,150	864,636	1,440,340	81.9	317,262	111,527	165,719	111,047

RACOR
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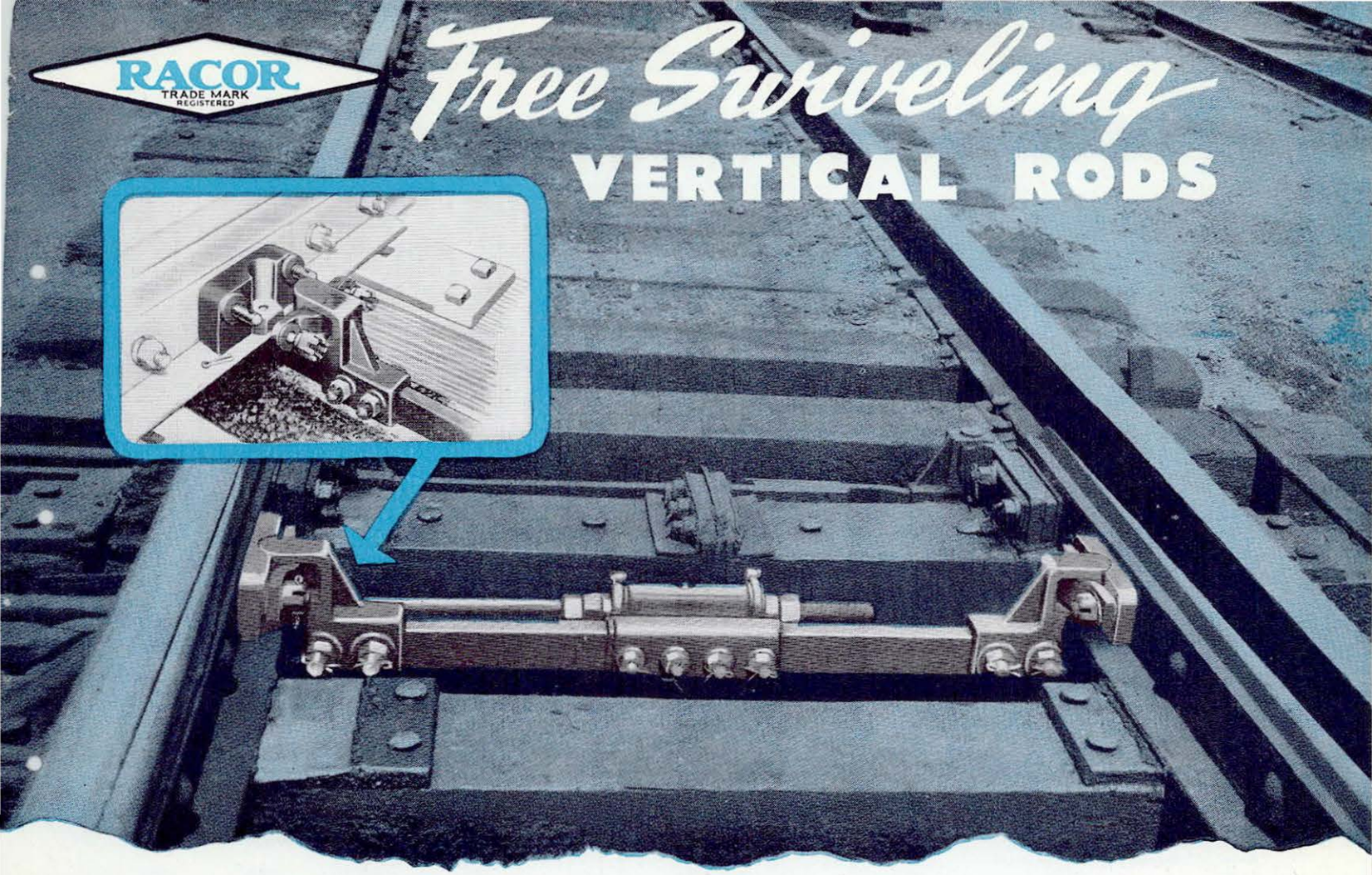
Free Swiveling VERTICAL RODS



For greatest strength and easier switch operation

The use of Racor's patented Switch Clips WITH VERTICAL RODS eliminate the damaging effects of switch rod strain and flexing under load or throw — reduce customary replacement of parts necessary where horizontal rods are used — permit easy and economical switch operation and assure maximum resistance against rolling points.

Racor Type "M" No. 1 VERTICAL ROD and Type "MF" VERTICAL FRONT ROD are positive protection against switch failures.

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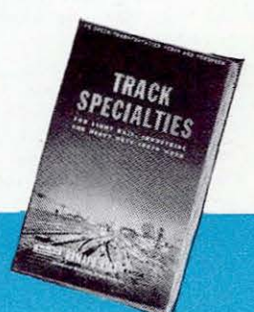

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Operating Revenues and Operating Expenses of Class I Steam Railways

(Switching and Terminal Companies Not Included)

FOR THE MONTH OF DECEMBER, 1945 AND 1944

Item	United States		Eastern District		Southern District		Western District	
	1945	1944	1945	1944	1945	1944	1945	1944
Miles of road operated at close of month	227,857	228,533	55,976	56,018	43,280	43,334	128,601	129,181
Revenues:								
Freight	$401,255,844	$555,809,572	$154,645,296	$201,539,322	$84,824,012	$104,559,789	$161,786,536	$249,710,461
Passenger	161,133,501	146,412,111	68,349,346	58,221,587	25,881,238	29,581,805	66,902,917	58,608,719
Mail	13,375,613	14,403,771	4,556,592	4,829,081	2,294,987	2,598,748	6,524,034	6,975,942
Express	8,046,440	10,593,671	933,091	2,210,283	058,727	1,679,568	6,154,622	6,703,820
All other operating revenues	29,879,965	29,638,537	12,740,584	12,428,037	4,388,131	5,297,264	12,751,250	11,913,236
Railway operating revenues	613,691,363	756,857,662	241,224,909	279,228,310	118,347,095	143,717,174	254,119,359	333,912,178
Expenses:								
Maintenance of way and structures	185,734,066	112,229,530	69,026,242	46,703,449	38,930,191	16,762,889	77,777,633	48,763,192
Depreciation	10,985,635	10,697,474	4,400,921	5,225,285	1,942,904	1,846,469	4,641,810	3,625,720
Retirements	13,379,102	9,224,725	4,587,925	4,329,787	1,454,424	1,823,224	7,336,753	3,071,714
Deferred maintenance	6,882,360	3,026,230	554,131	1,075,147	4,749,700	.....	1,578,529	1,951,083
Amortization of defense projects	57,348,289	2,383,119	23,419,274	634,177	13,327,331	418,198	20,601,684	1,330,744
Equalization	*7,841,062	*4,177,887	*2,466,341	1,105,238	*2,998,266	*3,991,486	*2,376,455	*1,291,639
All other	104,979,742	91,075,869	38,530,332	34,333,815	20,454,098	16,666,484	45,995,312	40,075,579
Maintenance of equipment	462,817,406	135,642,013	209,758,218	52,293,836	105,423,752	26,366,600	147,635,436	56,981,577
Depreciation	17,479,962	18,029,360	6,571,014	7,598,697	3,984,302	3,597,735	6,924,646	6,832,928
Retirements	*28,008	*5,928	4,909	*2,719	*10,409	*2,470	*22,508	*739
Deferred maintenance and major repairs	3,378,423	1,751,784	211,262	19,813	2,323,460	.....	843,701	1,731,971
Amortization of defense projects	336,692,646	16,516,376	158,888,355	5,284,487	79,929,980	3,834,009	97,874,311	7,397,880
Equalization	*60,584	35,808	29,418	12,060	889	2,483	*90,891	21,265
All other	105,354,967	99,314,613	44,053,260	39,381,498	19,195,530	18,934,843	42,106,177	40,998,272
Traffic	13,610,095	12,990,476	4,901,825	5,331,666	2,379,796	2,237,551	6,328,474	5,421,259
Transportation—Rail line	269,610,000	267,100,289	115,042,954	117,038,667	44,449,506	45,478,614	110,117,540	104,583,008
Transportation—Water line	14,368	*2,700	.....	.....	.....	.....	14,368	*2,700
Miscellaneous operations	11,370,395	10,482,447	4,306,876	3,962,353	1,586,641	1,584,163	5,476,876	4,935,931
General	20,174,466	17,426,649	8,468,784	7,326,214	4,190,750	3,476,642	7,514,932	6,623,793
Railway operating expenses	963,330,796	555,868,704	411,504,901	232,656,185	196,960,636	95,906,459	354,865,259	227,306,068
Net revenue from railway operations	*349,639,433	200,988,958	*170,279,992	46,572,125	*78,613,541	47,810,715	*100,745,900	106,606,118
Railway tax accruals	*325,707,179	111,356,585	*144,201,794	25,762,791	*69,076,816	28,921,003	*112,428,569	56,672,791
Pay-roll taxes	18,692,130	19,122,011	7,783,804	7,876,988	3,153,096	3,297,917	7,755,230	7,947,106
Federal income taxes‡	*361,580,112	62,722,102	*157,203,547	1,584,817	*76,065,077	21,006,229	*128,311,488	40,131,056
All other taxes†	17,180,803	29,512,472	5,217,949	16,300,986	3,835,165	4,616,857	8,127,689	8,594,629
Railway operating income	*23,932,254	89,632,373	*26,078,198	20,809,334	*9,536,725	18,889,712	11,682,669	49,933,327
Equipment rents—Dr. balance	8,439,504	11,232,491	3,871,333	4,137,089	*1,042,690	352,465	5,610,861	6,742,937
Joint facility rent—Dr. balance	4,530,114	5,428,317	2,148,852	2,396,120	606,964	397,496	1,774,298	2,634,701
Net railway operating income	*36,901,872	72,971,565	*32,098,383	14,276,125	*9,100,999	18,139,751	4,297,510	40,555,689
Ratio of expenses to revenues (per cent)	157.0	73.4	170.6	83.3	166.4	66.7	139.6	68.1

FOR TWELVE MONTHS ENDED WITH DECEMBER, 1945 AND 1944

Item								
Miles of road operated at close of month	228,473	228,692	56,002	56,081	43,328	43,371	129,143	129,240
Revenues:								
Freight	$6,533,868,763	$6,998,614,850	$2,404,531,608	$2,666,021,795	$1,229,031,810	$1,325,844,646	$2,900,305,345	$3,006,748,409
Passenger	1,716,378,492	1,790,305,287	704,240,747	723,800,493	314,384,218	352,289,463	697,753,527	714,215,331
Mail	129,571,450	130,245,806	44,333,085	43,700,512	22,346,729	23,588,067	62,891,636	62,957,227
Express	143,968,565	143,852,586	39,227,545	45,202,610	20,637,906	21,360,054	84,103,114	77,289,922
All other operating revenues	378,561,903	373,771,283	163,568,747	160,740,142	52,983,469	53,541,189	162,009,687	159,489,952
Railway operating expenses‡	8,902,349,173	9,436,789,812	3,355,901,732	3,639,465,552	1,639,384,132	1,776,623,419	3,907,063,309	4,020,700,841
Expenses:								
Maintenance of way and structures	1,411,345,491	1,263,291,759	501,057,393	483,461,798	256,712,268	215,206,994	653,575,830	564,622,967
Depreciation	118,846,449	108,389,704	51,532,788	47,736,660	19,211,125	17,838,114	48,102,536	42,814,930
Retirements	27,632,706	26,290,303	7,398,626	9,480,442	3,283,396	3,962,100	16,950,684	12,847,761
Deferred maintenance	3,531,160	*1,086,200	52,586	643,289	4,749,700	.....	*1,271,126	*1,729,489
Amortization of defense projects	115,716,722	19,950,212	31,300,300	6,309,583	21,829,354	3,576,169	62,587,068	10,064,460
Equalization	.....	.....	.....	.....	.....	.....	.....	.....
All other	1,145,618,454	1,109,747,740	410,773,093	419,291,824	207,638,693	189,830,611	527,206,668	500,625,305
Maintenance of equipment	2,147,428,122	1,587,484,858	839,515,700	659,551,638	428,629,179	299,813,474	879,283,243	628,119,746
Depreciation	215,389,896	214,765,714	90,101,821	90,758,384	43,522,644	42,970,750	81,765,431	81,036,580
Retirements	*132,261	*28,237	*64,979	*7,377	*77,337	*12,726	10,055	*8,134
Deferred maintenance and major repairs	1,852,750	539,724	165,712	35,250	2,323,460	.....	*636,422	504,474
Amortization of defense projects	709,381,057	171,098,530	241,858,243	56,344,987	161,693,585	43,254,682	305,829,229	71,498,861
Equalization	.....	.....	.....	.....	.....	.....	.....	.....
All other	1,220,936,680	1,201,109,127	507,454,903	512,420,394	221,166,827	213,600,768	492,314,950	475,087,965
Traffic	144,136,415	136,744,340	51,471,123	49,839,537	26,999,361	24,796,822	65,665,931	62,107,981
Transportation—Rail line	3,015,634,529	2,973,906,978	1,313,948,054	1,315,709,007	506,555,692	503,124,099	1,195,130,783	1,155,073,872
Transportation—Water line	16,165	2,794	.....	.....	.....	.....	16,165	2,794
Miscellaneous operations	122,193,280	119,294,558	44,852,390	42,754,750	18,454,316	19,230,236	58,886,574	57,309,572
General	211,045,109	201,337,398	86,077,154	81,594,241	41,291,955	38,914,494	83,676,000	80,828,663
Railway operating expenses§	7,051,799,111	6,282,062,685	2,836,921,814	2,632,910,971	1,278,642,771	1,101,086,119	2,936,234,526	2,548,065,595
Net revenue from railway operations	1,850,550,062	3,154,727,127	518,979,918	1,006,554,581	360,741,361	675,537,300	970,828,783	1,472,635,246
Railway tax accruals	825,361,630	1,846,043,127	151,535,243	534,576,569	191,538,150	431,049,243	482,290,237	880,417,315
Pay-roll taxes	230,527,017	230,988,364	95,620,977	97,069,642	39,838,300	40,069,718	95,067,740	93,849,004
Federal income taxes†	307,333,867	1,303,895,495	*65,771,478	297,690,556	95,330,758	330,943,736	277,774,587	675,261,203
All other taxes	287,500,746	311,159,268	121,683,744	139,816,371	56,369,092	60,035,789	109,447,910	111,307,108
Railway operating income§	1,025,188,432	1,308,684,000	367,446,675	471,978,012	169,203,211	244,488,057	488,538,546	592,217,931
Equipment rents—Dr. balance	131,355,697	152,013,713	55,952,601	64,145,890	*3,802,853	5,714,034	79,205,949	82,153,789
Joint facility rent—Dr. balance	43,610,669	50,343,132	21,685,471	22,946,538	4,936,214	5,091,375	16,988,984	22,305,219
Net railway operating income	850,222,066	1,106,327,155	289,808,603	384,885,584	168,069,850	233,682,648	392,343,613	487,758,923
Ratio of expenses to revenues (per cent)	79.2	66.6	84.5	72.3	78.0	62.0	75.2	63.4

* Decrease, deficit, or other reverse items.

† Includes income tax, surtax, and excess-profits tax.

‡ Railway operating revenues are after deduction of $47,904,467 for the twelve months ended with December 1945 and $46,569,868 for the twelve months ended with December 1944 to create a reserve for land grant deductions in dispute.

§ A number of carriers included in their accounts for the period charges to operating expenses in excess of normal accruals and credits to railway tax accruals as a result of the shortened period of amortization of defense projects. The amounts reported were as follows: Amortization of defense projects, $593,884,938; road, $90,576,147; equipment, $503,308,791; tax credit, $433,867,450.

Compiled by the Bureau of Transport Economics and Statistics, Interstate Commerce Commission. Subject to revision.

Adjustment Board Decisions

The National Railroad Adjustment Board has rendered its decision in 21 cases involving disputes between various railways and labor organizations representing their employees. In *Award No. 10683, Docket No. 19302, Curtis W. Roll, Referee, the Order of Railway Conductors* protested against the establishment by the *Alton* of a class of employees known as ticket collectors whose duties were to collect tickets under the supervision of the regular conductor. Notwithstanding the fact that both the trainmen's contract and the conductors' contract contained rates of pay for ticket collectors and the further fact that such positions had been assigned for short periods of time in the suburban territory between Chicago and Joliet, Ill., the referee found that since such employees were not in use immediately prior to the carrier's attempt to establish such a position for the relief of regular passenger conductors on through trains, such a class of employees did not exist and that the work assigned these men should have been assigned to qualified passenger conductors and paid for at the higher passenger conductors' rates. A dissent to the referee's decision was filed by the carrier members of the board.

The claim of a yard foreman for one day's pay at yard rates plus three hours overtime because a yard helper was used as a foreman on a work train at Boston, Mass., when the complainant, a qualified foreman, was available, was denied. The record shows that the foreman was offered one of three vacancies available on the first trick of the day in question, which he refused, desiring to work one of the other assignments instead. When the crew dispatcher refused to place him on any other job, the complaining foreman returned to his home, declining to work at any job other than the one of his choice. *Referee Curtis W. Roll,* in his opinion, stated that the "seniority rights of Yard Foreman R. T. Elwell did not extend to the point of entitling him, as a matter of right, to select and demand that he be assigned to a particular assignment of work, under the particular facts and circumstances presented by this record. Some discretion must of necessity be vested in management in the operation of its property. Yard Foreman Elwell was entitled to be assigned for work, and was offered an assignment, with rate of pay commensurate with the one he had selected. He refused to work the assignment offered. Having thus refused he must suffer the consequences of his own conduct." *Boston & Maine vs. B. of R. T., Award No. 10686, Docket No. 19619.*

In 13 *Seaboard Air Line* cases no referee was required. In an O. R. C.-B. of R. T. case (*Award No. 10620, Docket No. 6396*), employees on a Jacksonville-Miami passenger run which hauled l. c. l. in passenger equipment, and which involved no extra labor by the train crew, were awarded mixed-train rates of pay instead of straight passenger rates for a period from June 2 to November 16, 1937. The company had put in this service with the apparent acquiescence of employees to attract business which it could not otherwise have secured, and it cancelled the service and lost the business as soon as employees began putting in time tickets for the higher rate of

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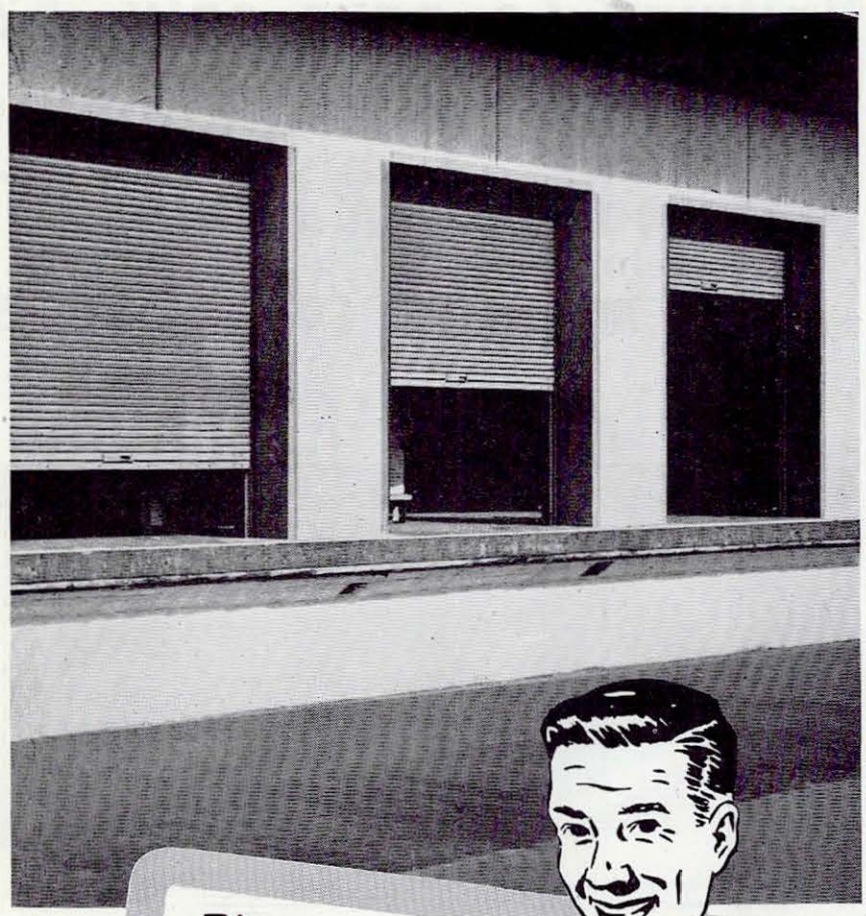

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pay, to which the Adjustment Board apparently believes they were entitled under a literal interpretation of existing agreements.

An O. R. C. claim (*Award No. 10621, Docket No. 9562*)—that a crew working local freight in one direction and through freight in the other should be paid the local rate in both directions—has been denied. In another O. R. C. case a conductor, suspended for 15 days in connection with a derailment, has been awarded pay for the period of his suspension (*Award No. 10622, Docket No. 9563*).

In *Award No. 10623, Docket No. 9739,* the O. R. C. claimed four days' pay for a conductor at work train rates because he was released from furnishing "train crew flag protection" for a steam derrick working on the main track, the derrick for four days subsequent to its initial operation having been assigned to a work train operating in the immediate vicinity and the crew of that train providing the necessary protection. The claim was denied.

A freight crew claiming pay for an express run which was handled by an extra passenger crew has had its claim denied in a B. of R. T. case (*Award No. 10624, Docket No. 13648*).

In an O. R. C. case (*Award No. 10625, Docket No. 20240*) a conductor claimed an extra day at the yard rate because, in order to get his train into the clear in the yard, he was required to pull through one yard track which was normally kept clear as a running track and to back into another. The Board denied the claim. In *Award No. 10626, Docket No. 20241,* the O. R. C. claimed payment at through freight rates for a trip of 160 mi. from Hermitage (Richmond), Va., to Raleigh, N. C., because of turning at Alberta, Va., and returning to Hermitage due to failure of one unit of a Diesel-electric locomotive, in addition to 100 mi. paid for turning. For the round-trip of 130.4-mi. (65.2-mi. each way) the claimant was paid two minimum days each, the O. R. C. claiming that he should have been paid 130 mi. for the going trip as he was originally called to make a trip to Raleigh. The claim was denied.

Another O. R. C. case involved the placement, at the request of a military officer, of a baggage car in a troop train on a track other than the one on which the remainder of the train was placed so that the baggage car could be unloaded easily by motor trucks. By special agreement troop trains in this territory were handled by through freight crews at rates of pay applicable to through freight trains. For the work in setting this baggage car over to another track the crew claimed and was awarded pay at local freight rates. (*Award No. 10627, Docket No. 20242*).

In *Award No. 10628, Docket No. 20244,* the O. R. C. claimed pay for an additional 150 miles at passenger rates on each of four trips between Hamlet, N. C., and Fendale, S. C., via McBee, N. C., due to the crews of extra passenger trains operating over the old East Carolina seniority district. The case was remanded to the parties to the dispute with instructions to reach an agreement as to whether the East Carolina seniority district extra board at Hamlet is maintained to cover all passenger service vacancies, both regular and unassigned, or just vacancies on regular pas-

senger service. In a final O. R. C. case, which was sustained, a crew claimed an additional minimum day at local freight rates for being required to shove another train, going in the opposite direction, over a hill within yard limits at a station where the claimant crew was performing other switching. (*Award No. 10630, Docket No.*

In two cases involving discipline assessed by the management for responsibility in connection with accidents, such discipline consisting of fifteen days' suspension, the first division denied the claims of the B. of R. T. and upheld the carrier. (*Award Nos. 10634 and 10636, Docket Nos. 6447 and 7049.*) In *Award No. 10637, Docket No. 12302,* the B. of R. T. sought additional payment of a minimum day at local freight rates for a lap-back trip which was made by the conductor and engine crew (who were paid), but not by two brakemen, who were relieved at the point of return. The lap-back trip was occasioned by an engine failure on a passenger train and the consequent necessity of exchanging engines with the local and a second passenger train to enable the disabled train to resume its trip. The carrier successfully contended that the entire crew had been relieved at the "lap-back" point and that the conductor and engine crew then started a new trip which, under the agreements, did not require the services of the two trainmen.

In *Award No. 10657, Docket No. 19497, Gulf, Colorado & Santa Fe* vs. *B. of L. E.,* the employees claimed a minimum day's pay of 100 miles for doubling two hills, in lieu of allowance of 44 mi., which was added to the 72 actual mi. made, as paid by the carrier, basing their claim on the contention that a double was equivalent to a "lap-back" trip. The board directed that the dispute be disposed of by allowing 44 mi. for the double as contended by the carrier, but directed that it be added to other mileage paid for on the trip, in this case a minimum day of 100 mi. instead of being added to 72 actual mi. as paid by the carrier.

In *Lehigh Valley vs. O. R. C. (Award No. 10672, Docket No. 19951),* the board denied the claim of a yard foreman for an additional day's pay at yard rates for each day on which he was required to couple air hose and test the air brakes of cars, at points where car inspectors were employed. Another case involving the same disputants *(Award No. 10671, Docket No. 20272)* resulted in a finding directing the carrier to reinstate a conductor with compensation from the date of his dismissal. The conductor was discharged for his responsibility in connection with a derailment of cars in his train, it being alleged that his inspection of the train was faulty. The board held that under the circumstances he had made the best possible inspection and it was unable to find where the carrier had successfully proved that the conductor had violated any of the carrier's rules.

Included in the recent decisions of the board were three disputes between the *Maine Central* and the *B. of L. F. and E.* In *Award No. 10648, Docket No. 19426, Referee Sidney St. F. Thaxter* held that

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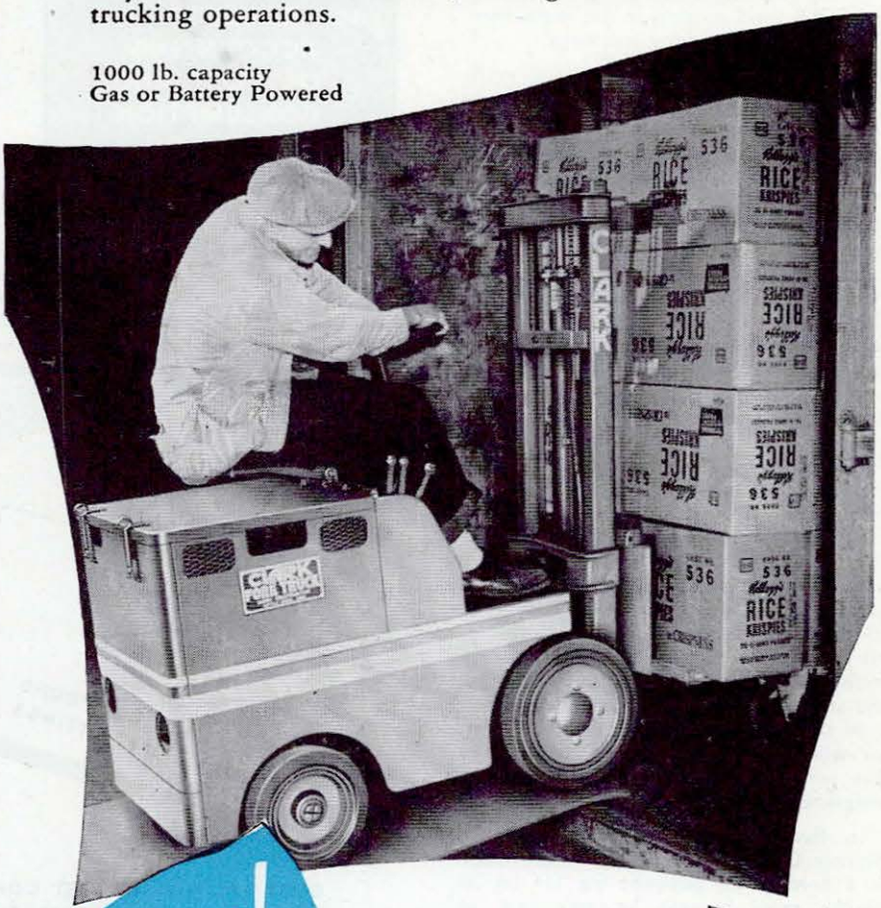

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the engine crew regularly assigned to train 2/B-12 be paid for 100 mi. helper service for pushing train BR-2 from Bangor, Me., to Northern Maine Junction, which trip was a part of their normal trip to Rigby, Me. At Northern Maine Junction the crew of 2/B-12 picked up a train and continued to Rigby as required by their normal assignment. The carrier contended and the employees admitted that the excess tonnage in train BR-2 could have been given train 2/B-12 for movement to Northern Maine Junction, 5.64 mi., and there set out and picked up by BR-2. However, since the tonnage was handled in one train for convenience of the carrier and to avoid delay, the referee held that the resulting excess-tonnage train should have been assisted by a switch engine as specifically provided in the contract, which engine was engaged in other work, rather than by a road train moving in the same direction and able to perform the work.

In *Award No. 10681, Docket No. 19572, Curtis W. Roll, referee,* the board granted an additional day's pay to a locomotive fireman who was required to fire a steam ditcher in lieu of the regular maintenance-of-way department employee who failed to report for duty. Under a special agreement between the union and the railway, a qualified locomotive engineer and fireman were required on the unit in question, although another agreement with the maintenance-of-way employees required the carrier also to use one of their class of employees as a fireman. Since there was work for only one fireman, the actual task of firing the machine was performed by the maintenance-of-way employee. When the latter did not report for duty and no other qualified employee from his department could be made available, the locomotive fireman was asked to fire the ditcher, for which task he was being paid although normally there was no work for him to do on this assignment. Upon completion of his day's work he requested pay for protecting his assignment which was granted, and an additional day's pay for working at it on the grounds that in firing the ditcher, for which he was already being paid, he was performing work outside his normal assignment.

In *Award No. 10682, Docket No. 19573, Referee Curtis W. Roll* denied the claim of a fireman for payment for 114 mi. at freight rates because he was held at Waterville, Me., to protect work as hostler, while a spare fireman who was second out, but not qualified as hostler, was used on an extra freight train called 30 min. before complainant was required to report for duty as a hostler. In this case the referee held that the carrier was within its rights in holding the complainant to protect a vacancy for which it knew there was no other qualified man available, subject to contract provisions which required the railway to make good on loss in earnings resulting from holding him off his regular turn. It was further held that the complaining fireman was not entitled to the $8.95 he would have earned had he been used in his turn, in addition to his earnings as hostler, and that, since the latter amounted to $15.29 which was more than he would have been paid had he not been so held, no additional compensation was due.

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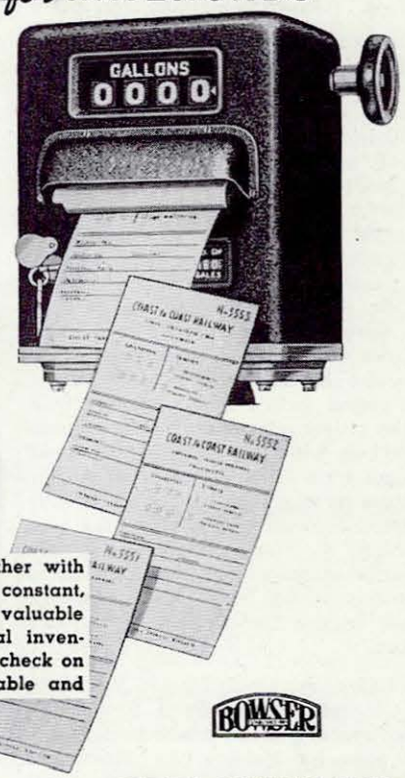

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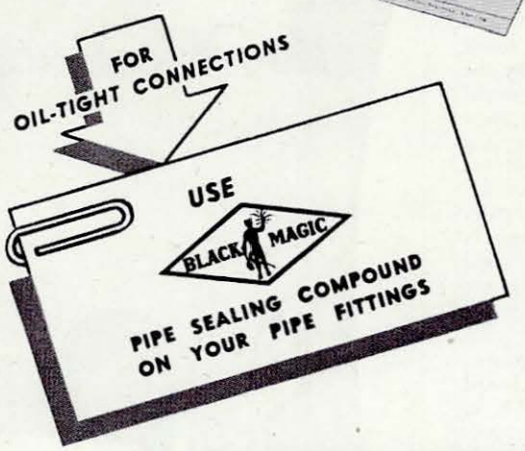

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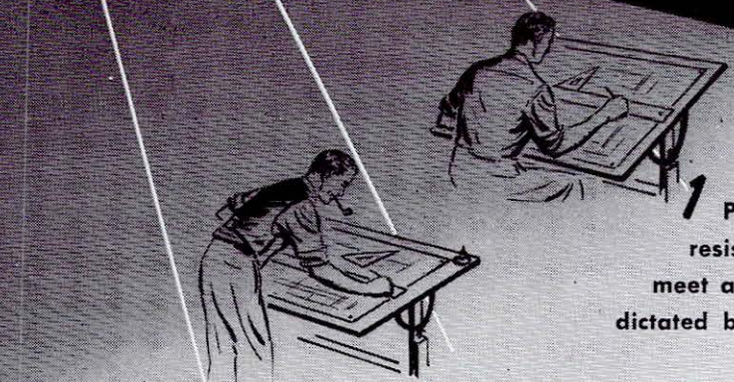

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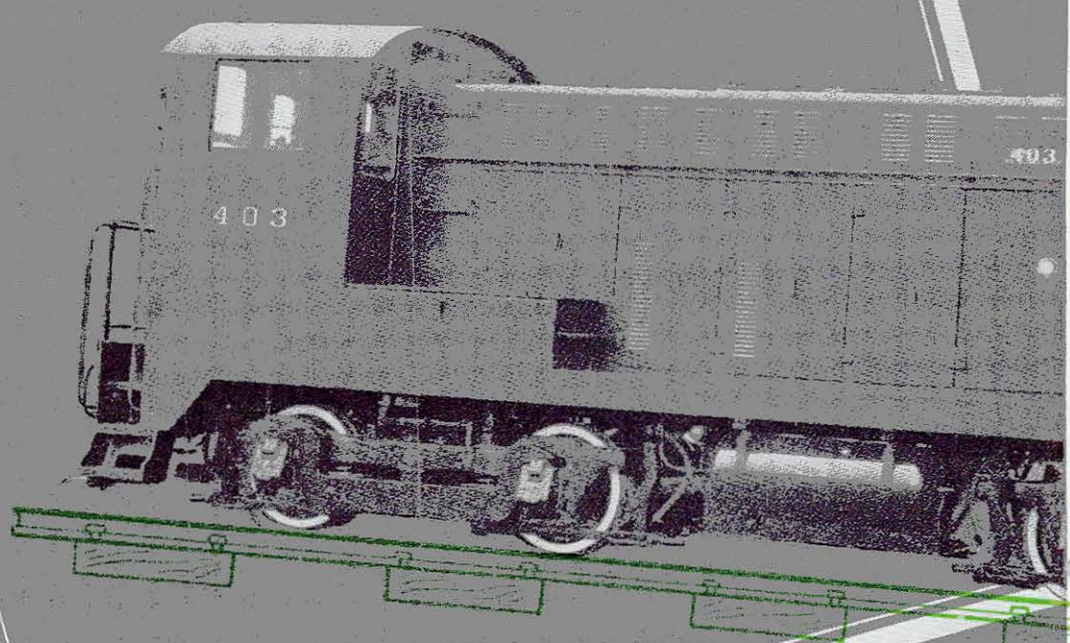
ON

SELECTION OF ADDITIONAL MOTIVE POWER

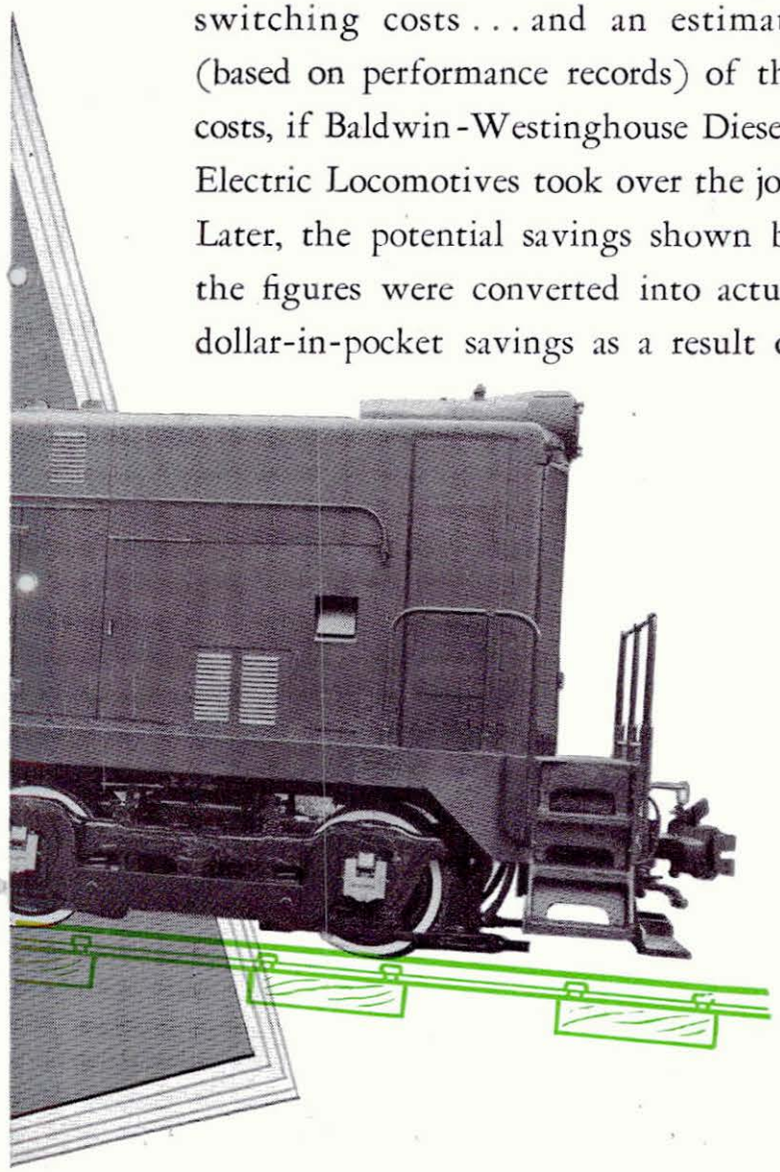


Here's the first step in cutting switching costs . . .

Savings up to $50,000 a year have started, for many railroads, with a half-dozen sheets of paper!

The sheets carried an analysis (based on expense records) of the railroad's current switching costs . . . and an estimate (based on performance records) of the costs, if Baldwin-Westinghouse Diesel-Electric Locomotives took over the job. Later, the potential savings shown by the figures were converted into actual dollar-in-pocket savings as a result of the purchase of Baldwin-Westinghouse units.

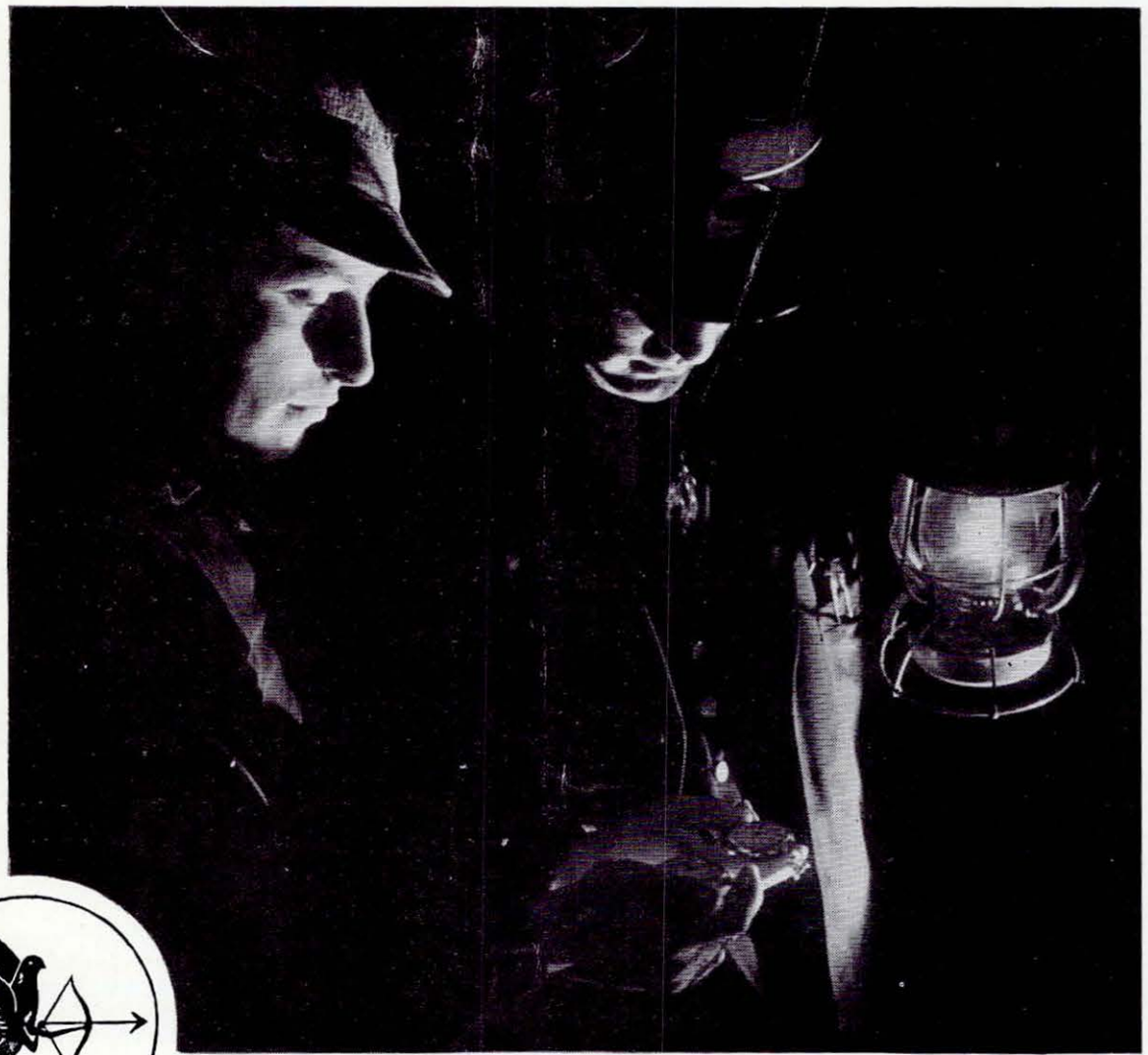
In the period ahead, the cutting of costs will be a vital factor in showing a profit; and consequently, the economy possibilities of Baldwin-Westinghouse Diesel-Electric Locomotives are something no road should overlook. A representative with the "know how" will be glad to make a survey and render a report on any set of conditions on your line without cost or obligation, and without further delay.



THE **BALDWIN-**
LOCOMOTIVE WORKS, PHILADELPHIA

BLW THE BALDWIN GROUP

Westinghouse
ELECTRIC CORPORATION, EAST PITTSBURGH, PA.



In Watches or Feedwater ....It's STANDARD Performance

THE engineman's watch came from Massachusetts — the conductor's from Pennsylvania — yet in timekeeping characteristics they are identical twins and will not deviate from the standard clock more than 30 seconds each week.

If each one of the billions of gallons of water used by locomotives each year came out of the ground with identical characteristics — a major problem as old as the railroads themselves would be simplified.

Unfortunately, the 48 states collectively produce about every type of "bad water" known to man. For more than five decades the railroads have relied on THE BIRD-ARCHER CO. for the rectification of boiler feedwater to meet the uniformly high standard required by modern steam locomotives.

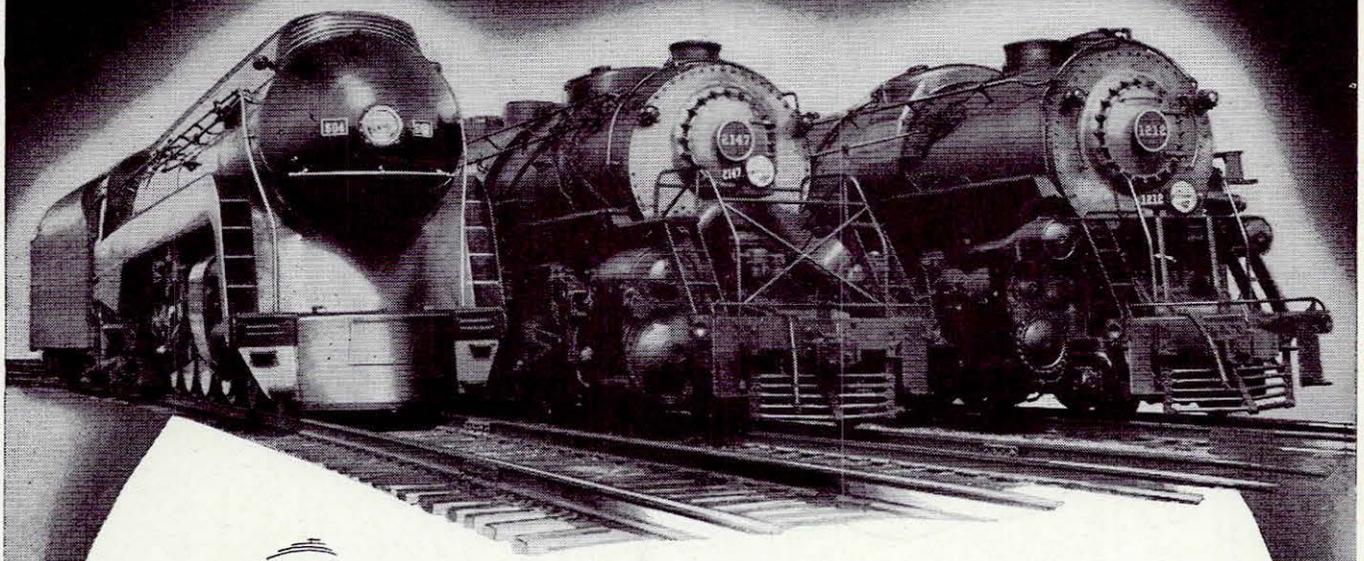
B-A WATER TREATMENT

THE BIRD-ARCHER CO. **400 Madison Ave., New York**

Chicago Office . . Wrigley Bldg. **Laboratory & Plant . . 4337 N. American St., Philadelphia**

Modern Power ... Modern Stokers

A VITAL COMBINATION . . .



SERVICE RECORDS indicate clearly that Standard Stokers solve the all-important problem of firing modern coal burning power . . . always dependable in operation, Standard Stokers guarantee maximum firing efficiency in making available the necessary power to effect greater hauling capacity. In keeping abreast with the railroads' development of new power, Standard Stokers will have the answer for tomorrow's mechanical firing needs in the revolutionary designs of postwar coal burning locomotives.

The three different classes of modern high powered locomotives shown above were designed and built by the Norfolk & Western, each for a particular type of service. Records established by the fleet of 116 locomotives in service reflect high utilization with economy of operation.

THE STANDARD STOKER COMPANY, INC

NEW YORK • CHICAGO • ERIE • MONTREAL

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Great things are happening on the

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It's a Great Railroad

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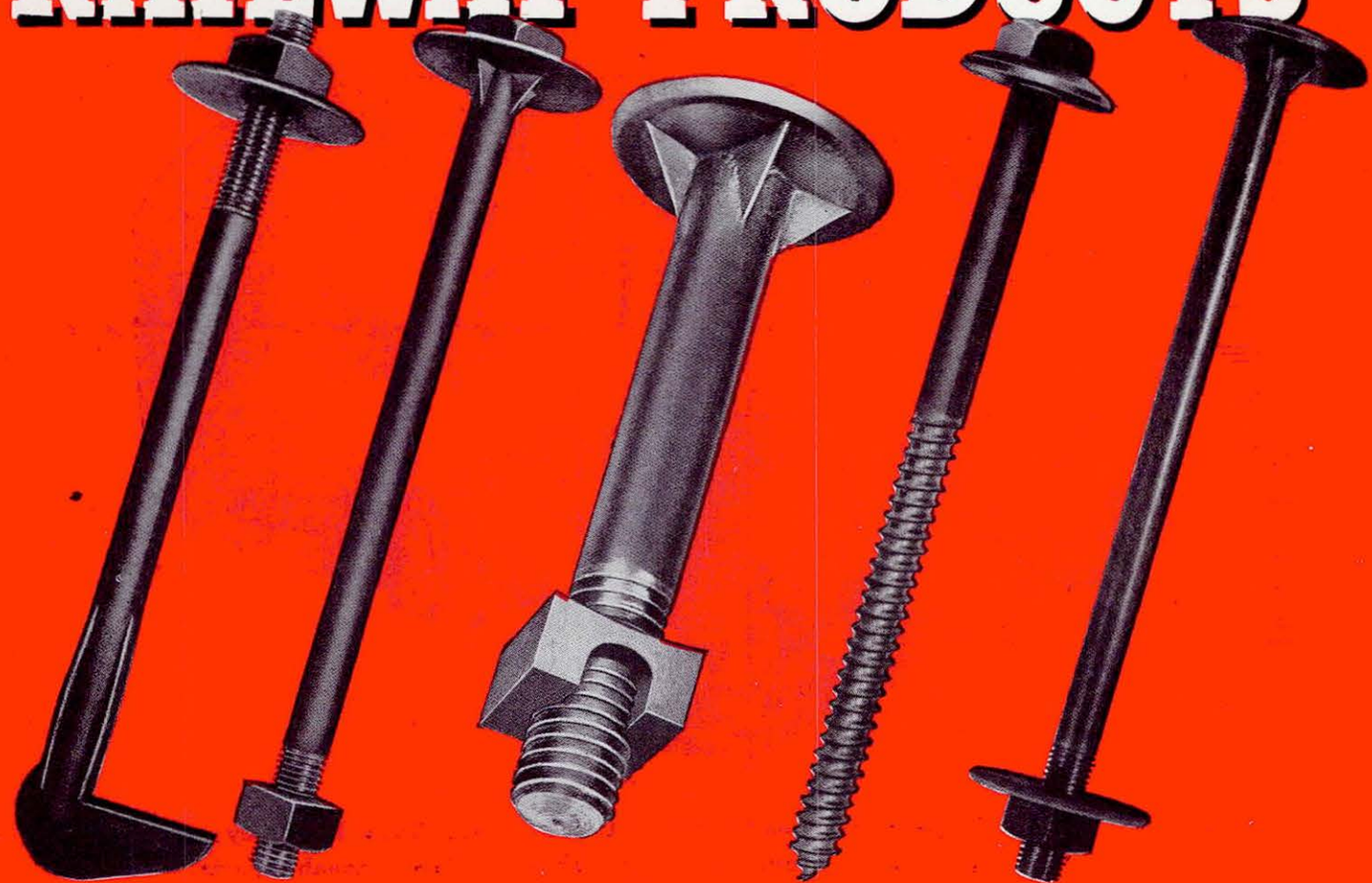
RAILWAY PRODUCTS



SEALTITE HOOK BOLT

SEALTITE TIMBER BOLT

SEALTITE CAR BOLT

SEALTITE LAG SCREW

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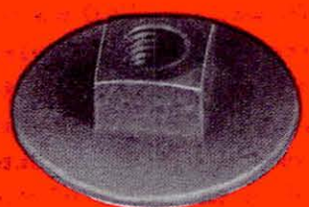
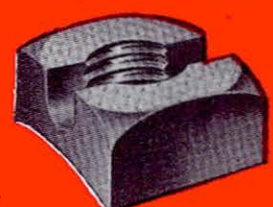


SEALTITE WASHER NUT

***Double-Life* FINISH—Sealed in Zinc**

Actual service tests reveal distinct economies are effected by specifying Sealtite Railway Products with Double-Life Hot-Dipped, sealed in zinc finish. Corrosion is retarded—the fasteners have much longer life and expensive replacements are eliminated. Protect your investment—*specify* Hot-Dipped Galvanized—Sealed in zinc.

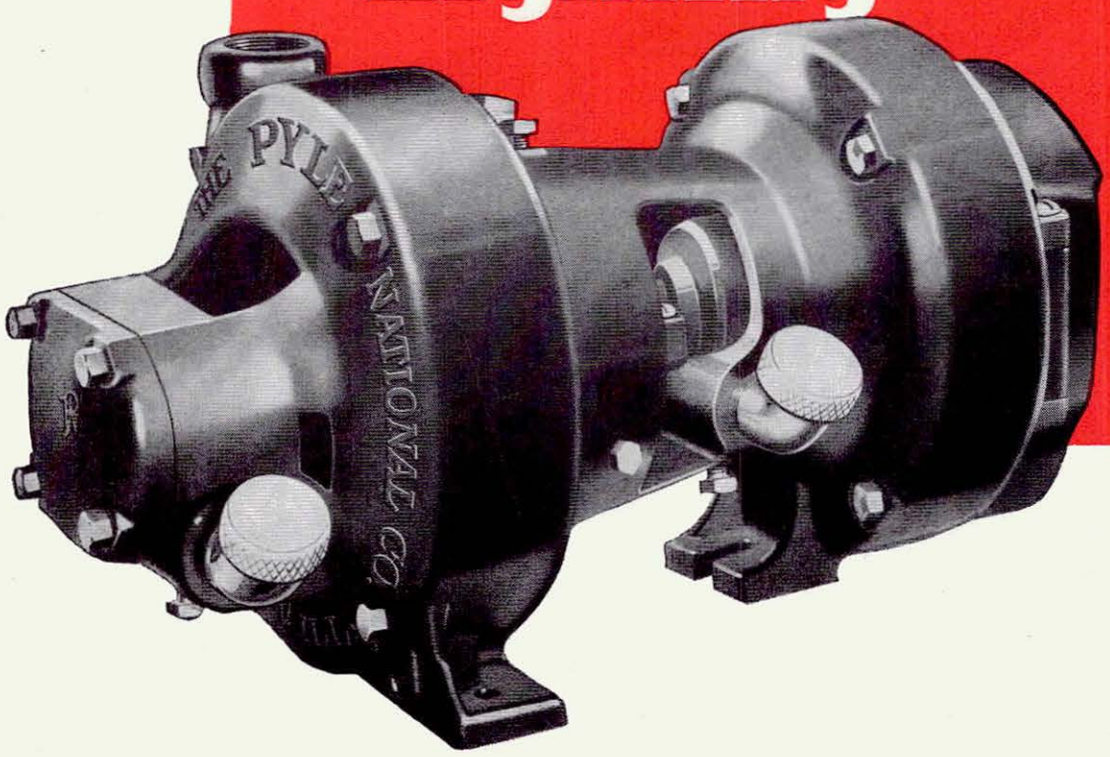


LOKTITE NUT

LEWIS BOLT & NUT COMPANY, 504 Malcolm Ave. S.E., Minneapolis, Minn.

Serving 72% OF AMERICA'S CLASS I RAILWAYS

Reliable Locomotive Lighting



Type K-240 headlighting turbo-generator provides the reliable service and uniform electrical performance required for present-day operating conditions. It furnishes dependable power for all the requirements of modern locomotive lighting, and stands up to continuous duty with the minimum of attention. Existing Type K-2 equipment can be converted to the modern Type K-240 by application of interchangeable parts.

Pyle-National turbo-generators are available in a full range of types, capacities 500 watts to 1200 watts, for all classes of service. Pyle-National headlight cases, cab lighting fixtures, and wiring equipment allow you to choose from a complete line, adapted to the needs of any type of modern motive power.

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MODERN CAR CONSTRUCTION DEMANDS ALLOY STEELS

New speed and safety, new comfort and convenience, thrilling new luxury in travelling experience . . . all are on the way as railroads and car builders unfold their postwar plans. And these new programs that call for easier-riding, space and weight-saving features in passenger car design will also demand the extra strength and safety, and the all-weather reliability of alloy steels.

The extremely high strength-weight ratios and the proven dependability of Vanadium Steels make them ideal for stress-carrying parts, light-weight weldments, and frame and spring construction—to meet these new-day passenger car design requirements.

Detailed information and specifications covering many applications of Vanadium Steels for railroad needs are available in our Technical Literature. Copies will be supplied promptly on request. In addition, our metallurgical staff, working in close cooperation with both the railroads and equipment builders, stands ready to show you how *alloy steels do the job better* in modern car as well as locomotive construction.

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* Southern Pacific
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* Chicago St. Paul Mpls. & Omaha
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* Chicago Burlington & Quincy
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SINCE 1941
* Chesapeake & Ohio
Kansas City Southern
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WAR PERIOD

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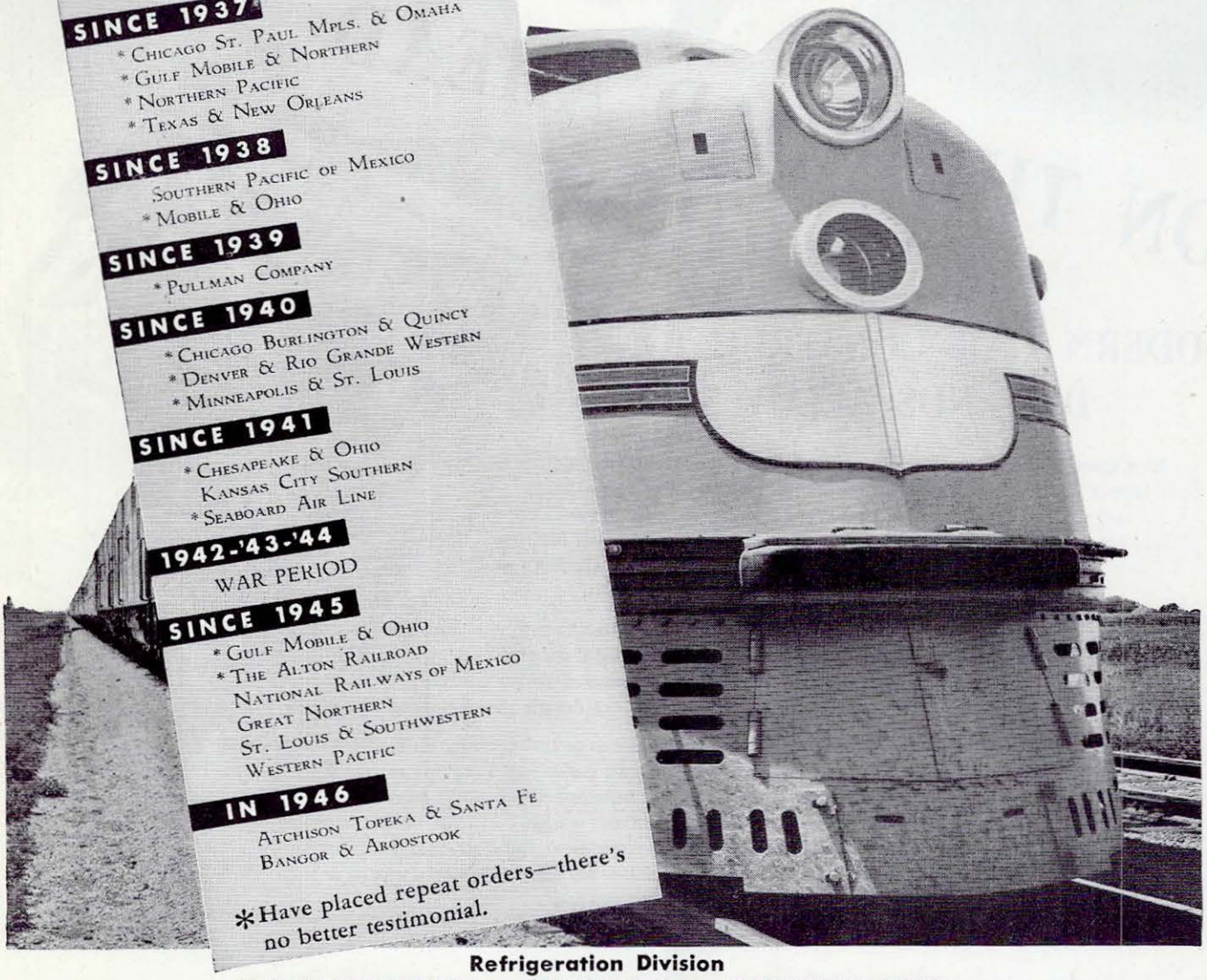

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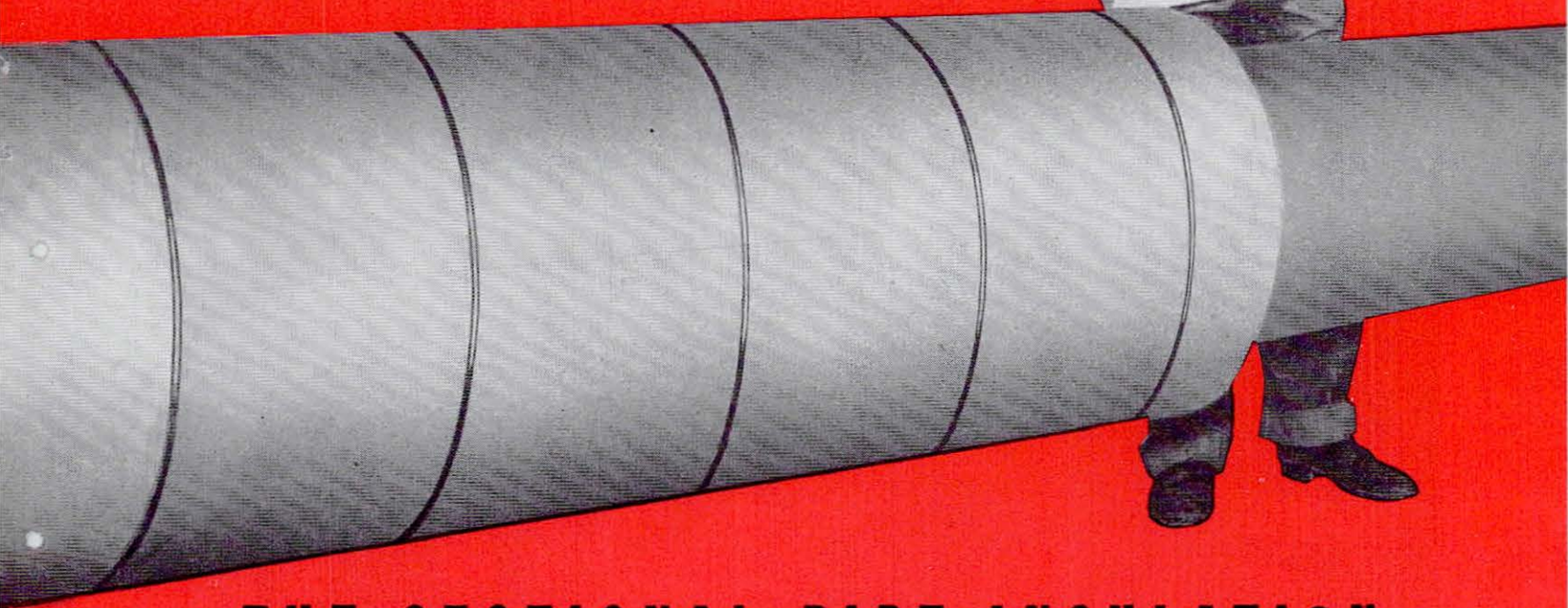

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THEY lie in hospitals, thousands of America's finest—sick, cruelly maimed in the fight for our freedom. Who is to write their letters, hear their troubles, answer when they call for "Mom"? Mom can't be there. But your Red Cross can, *and must* be there.

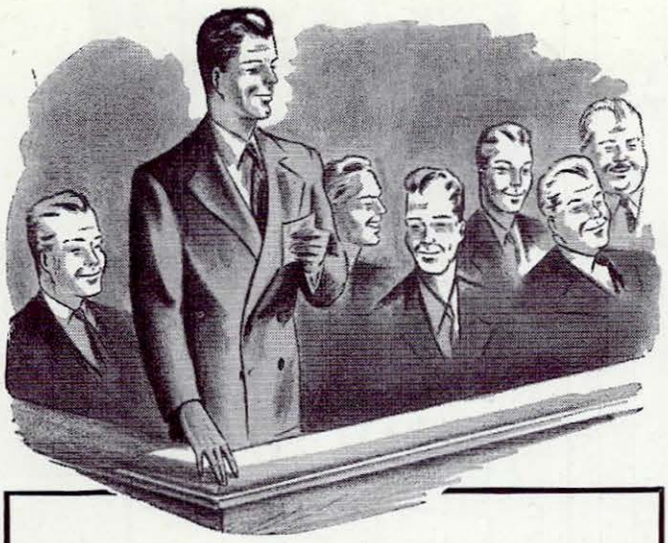
Many thousands more young Americans are still overseas. They, too, count on the Red Cross for comfort and cheer.

So won't you give to the Red Cross? Give *now*. This is *your* chance to say, "Thanks, Soldier, for all you've done!"

YOUR Red Cross MUST CARRY ON . . . GIVE!

RAILWAY AGE

★ *Prepared by the Advertising Council in Cooperation with the American Red Cross* ★



Why Railroad Men's Verdict Is "JUSTRITE"

They've Found This Inspector's Lantern Always Gives a Fine Performance

This newly designed Justrite Inspector's Lantern No. 2111 has already won top marks among railroad men for durability and dependability. It's a finely built lantern with a big wood grip handle for easy comfortable carrying, and a space for spare bulbs.

Uses New Honeycomb Lens

The lantern is equipped with the new Justrite Honeycomb Lens mounted in a 2½" headpiece. This means it provides a totally different type of light, for the Justrite Honeycomb Lens throws a circle of clear even light over a much wider area than ordinary lights—a circle 3 ft. in diameter at 8-ft. distance. Dark spots and rings are eliminated —there's just bright fine light. The kind of light that helps a man do his job "just right!"

Ask your supplier about Justrite Safety Products or write direct for details.

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APPROVED SAFETY ELECTRIC LANTERNS

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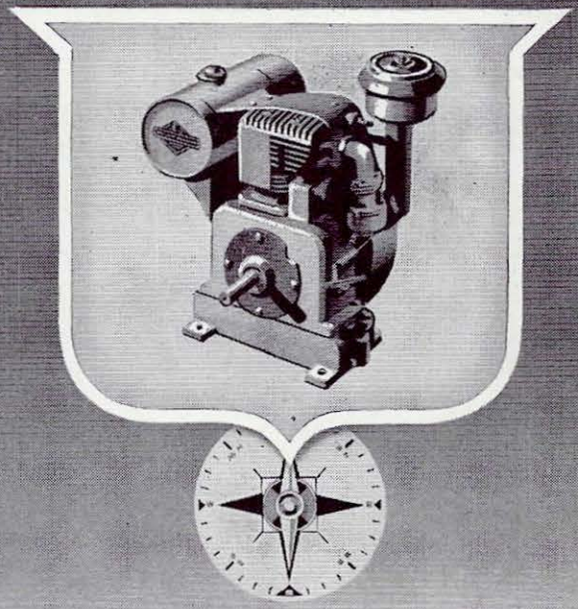

ALL over the United States and Canada, and in many other countries, you will find Briggs & Stratton *Authorized Service Stations.* Operating under factory policies and procedures, they are again becoming fully equipped to take care of any emergency — to adjust, repair, or rebuild any model of Briggs & Stratton engines, even though it is a veteran of ten or twenty years of service. This authorized service is maintained to protect your investment in Briggs & Stratton engines. It is an important *added advantage,* recognized alike by manufacturers, dealers, and users of appliances, farm machinery and industrial equipment.

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1615 RA

Maintenance Equipment Company
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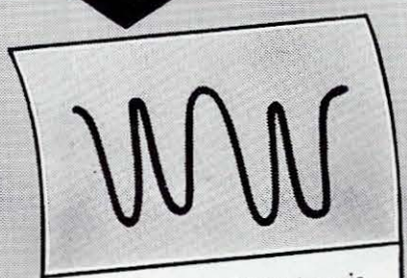
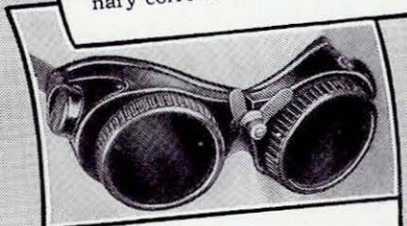


Every Willson-Weld lens is marked like this. Purpose: to show that it meets highest Federal specifications. Reduces intensity of visible light, filters out harmful ultra-violet and infra-red rays.

Clear cover lenses to protect green Willson-Weld lenses from pitting. Both lenses easily replaceable. Welding goggles fit comfortably over ordinary correction spectacles.



Style CW-60

Shade number — determined by individual photometer test —indicates density and thickness of each lens. Simplifies selection. Lenses easily interchanged for different types of welding.

For help with your welding eye-protection problems, consult your Willson distributor or write for further information.

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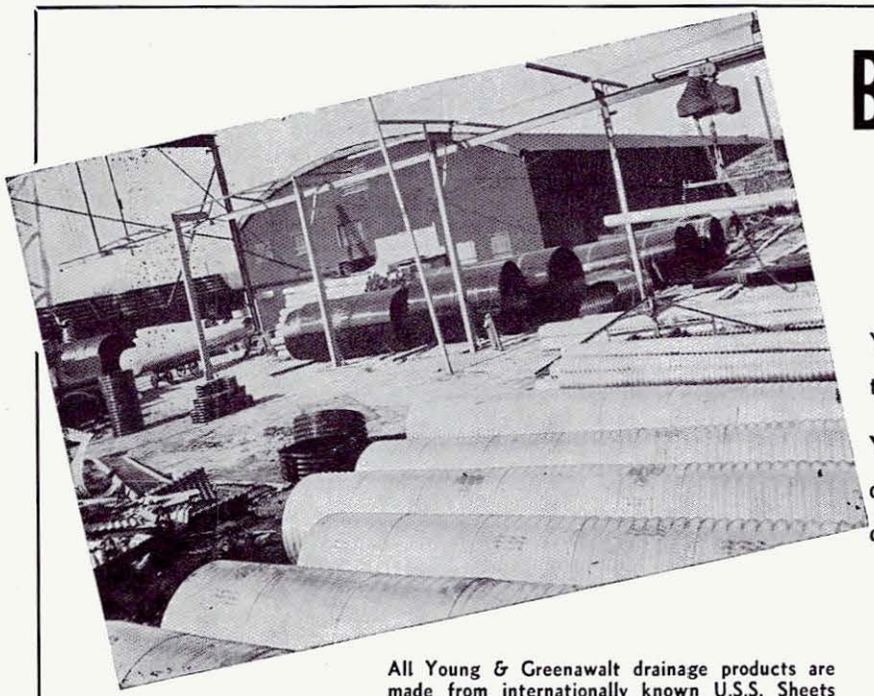

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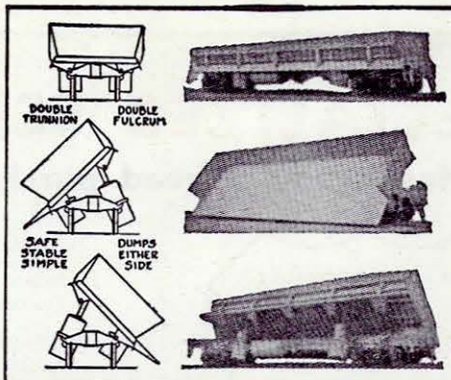

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Fuel	Oil
Total Engine Wheel Base	37' 7"
Total Engine Weight	205,950 lbs.
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See Our Catalog In SWEETS

VIKING PUMP COMPANY
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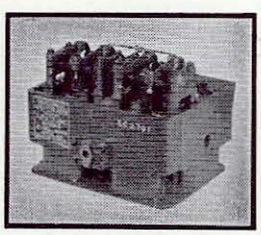
"MOONEY" QUAD-VALVE CYLINDER HEADS



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Models 120, 146 and 148 Winton Engines

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"MOONEY" QUAD-VALVE CYLINDER HEADS—

complete with Valve-Motion—insure

- Increased Power
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Manufactured by

AUTO ENGINE WORKS (INC.)
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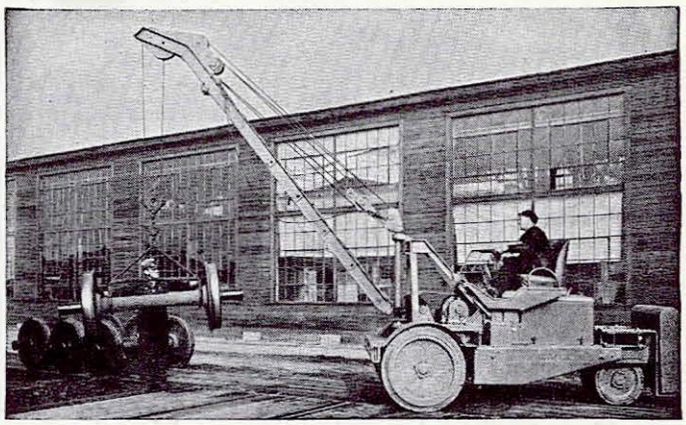
HANDLE REPAIR LOADS Once!



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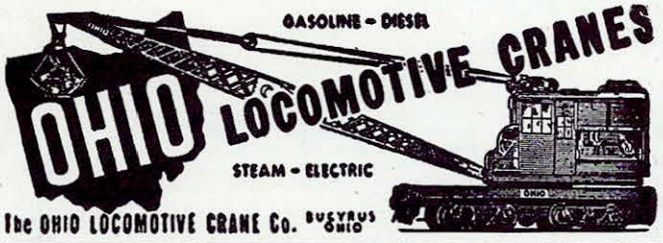

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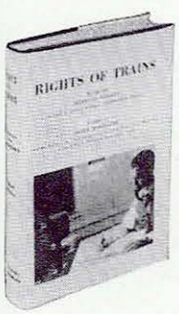

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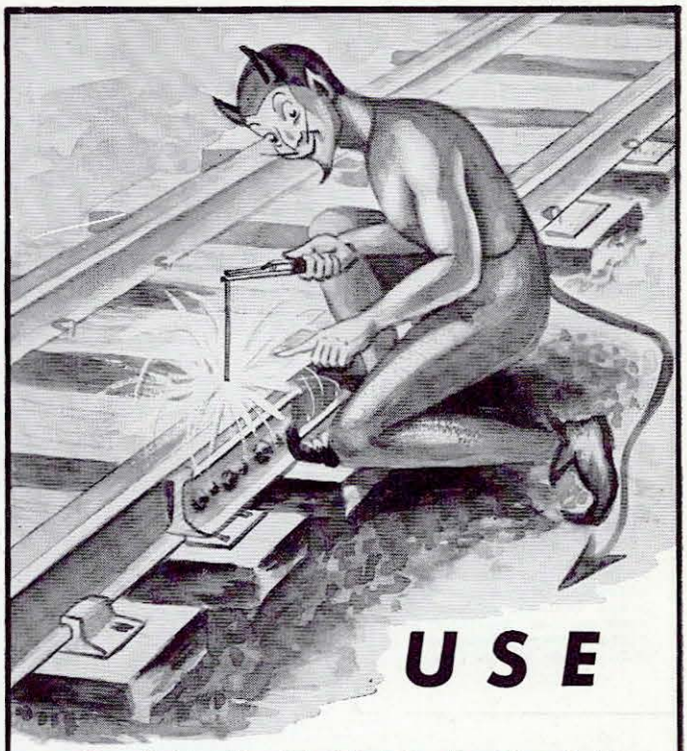

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Index to Advertisers

March 16, 1946

A

Aireon Manufacturing Corporation 90
Allis-Chalmers Mfg. Company 73
Aluminum Company of America 14, 15
American Arch Company, Inc. 103
American Brake Shoe Company, Ramapo-Ajax Division 110
American Bridge Company 57
American Creosoting Company 83
American Locomotive Company 20, 21
American Optical Company 38
American Steel Foundries 47
Anemostat Corporation of America 32
Armco Drainage & Metal Products, Inc.... 18
Association of American Railroads 26
Austin-Western Company 8, 9
Auto Engine Works (Inc.) 129

B

Baker Industrial Truck Division of The Baker-Raulang Company 111
Baldwin Locomotive Works, The 114, 115
Bethlehem Steel 3
Bird-Archer Co., The 116
Bowser, Inc. 112b
Briggs & Stratton Corporation 125

C

Canadian Cardwell Co., The 28
Cardwell-Westinghouse Co. 28
Champion Rivet Company, The 131
Chipman Chemical Company, Inc. 54
Clark Equipment Co., Railway Division 46, 113
Clark Tructractor Division, Clark Equipment Co. 112a
Classified Advertisements 130
Colgate Aircraft Corporation 23
Columbia Steel Company 57

D

Dampney Company of America, The 35
Dearborn Chemical Company 75, 76
Differential Steel Car Co. 128
Dulien Steel Products, Inc. 128
Durabla Manufacturing Company 48
Duryea Corporation, O. C. 49

E

Edison Storage Battery Division of Thomas A. Edison, Inc. 56
Electric Tamper & Equipment Co. 34
Enoz Chemical Company 128

F

Fairbanks-Morse & Company 71
Farnsworth Television & Radio Corporation 58
Firestone Co. 33
Flintkote Company, The 55
Franklin Railway Supply Co., Inc. 102
Frost Paint and Oil Corporation 29
Fuller Brush Co., The 52

G

General Chemical Company 50
General Electric Company 20, 21
General Machinery Corporation 10, 11
General Railway Signal Company 39 to 42 incl., Back Cover
General Steel Castings Corp. 6, 7
Get Together Department 130
Glazer Steel Corporation 130
Glidden Company, The 51
Gold Car Heating & Lighting Co. 131
Goodall Fabrics, Inc. 79
Gould Storage Battery Corporation 89
Graybar Electric Company 43
Great Lakes Steel Corporation 87
Griffin Wheel Company 78

H

Holland Company 62
Hunt Company, Robert W. 127
Hunt-Spiller Mfg. Corporation 106, 107
Hyman-Michaels Co. 128

I

Industrial Brownhoist Corp. 63
International Nickel Company, Inc., The .. 113
Iron & Steel Products, Inc. 130

J

Johns-Manville 30, 31
Jordan Company, O. F. 82
Justrite Manufacturing Company 125

K

Kershaw Company, Inc., The 130
Kinnear Mfg. Co., The 112

L

Lake Erie Engineering Corp. 22
Lewis Bolt & Nut Company 119
Lima Locomotive Works, Inc. 101
Logan Drinking Cup Co. 86

M

Magnus Metal Corporation 84
Magor Car Corporation 53
Maguire Industries, Incorporated 59
Mahon Company, The R. C. 69
Maintenance Equipment Company 126
Mancuso, Mario F. 130

N

National Aluminate Corp. 96
National Bearing Division of American Brake Shoe Company 19
National Lock Washer Company, The 37
National Pneumatic Company 85

O

Ogle Construction Co. 80
Ohio Locomotive Crane Co., The 131
Okonite Company, The 129
Orton Crane & Shovel Co. 67
Otis Elevator Company 36
Oxweld Railroad Service Company 12, 13

P

P & M Co., The 77
Pennsylvania Railroad 16, 17
Pettibone Mulliken Corporation 61
Philco Corp., Storage Battery Division ... 93
Pittsburgh Plate Glass Company 70
Porter Company, Inc. H. K. 2
Purdy Company, The 128
Pyle-National Company, The 120

R

Railway Educational Bureau, The 130
Railway Maintenance Corp. 91
Rail Joint Company, The .....Front Cover
Ramapo-Ajax Division, American Brake Shoe Company 110
Republic Steel Corp. 100
Rosemary Sales, a Division of Simmons Co. 68
Rozier-Ryan Company 130
Rust-Oleum Corporation 60

S

Safety Car Heating and Lighting Company, Inc., The 64
Safety First Shoe Company 81
Schaefer Equipment Company 72
Scullin Steel Co. 94
Sicard Industries, Inc. 95
Silent Hoist & Crane Co. 129
Simmons-Boardman Publishing Corporation 44, 45, 131
Simmons Co., Rosemary Sales Division .. 68
Sinclair Refining Company 4, 5
Sonken-Galamba Corp. 130
Standard Car Truck Company 66
Standard Register Company, The 27
Standard Stoker Company, Inc., The 117
St. Louis-San Francisco Railroad 118
Stromberg Carlson Company 74
Superheater Co., The 104
Symington-Gould Corporation, The 135

T

Truscon Steel Company, Subsidiary of Republic Steel Corporation 100

U

Union Asbestos and Rubber Co. 123
Union Carbide & Carbon Corporation ..12, 13
Union Switch & Signal Company ..98, 108, 109
United States Envelope Company 86
United States Steel Export Company 57

V

Vanadium Corporation of America 121
Viking Pump Company 129

W

Waugh Equipment Company 65
Waukesha Motor Company 122
Webster Electric Company 88
Western Railroad Supply Company 24, 25
Westinghouse Air Brake Co. 105
Westinghouse Electric Corp. 114, 115
Willson Products, Incorporated 126
Woodings Forge & Tool Co. 92

Y

Young & Greenawalt 127

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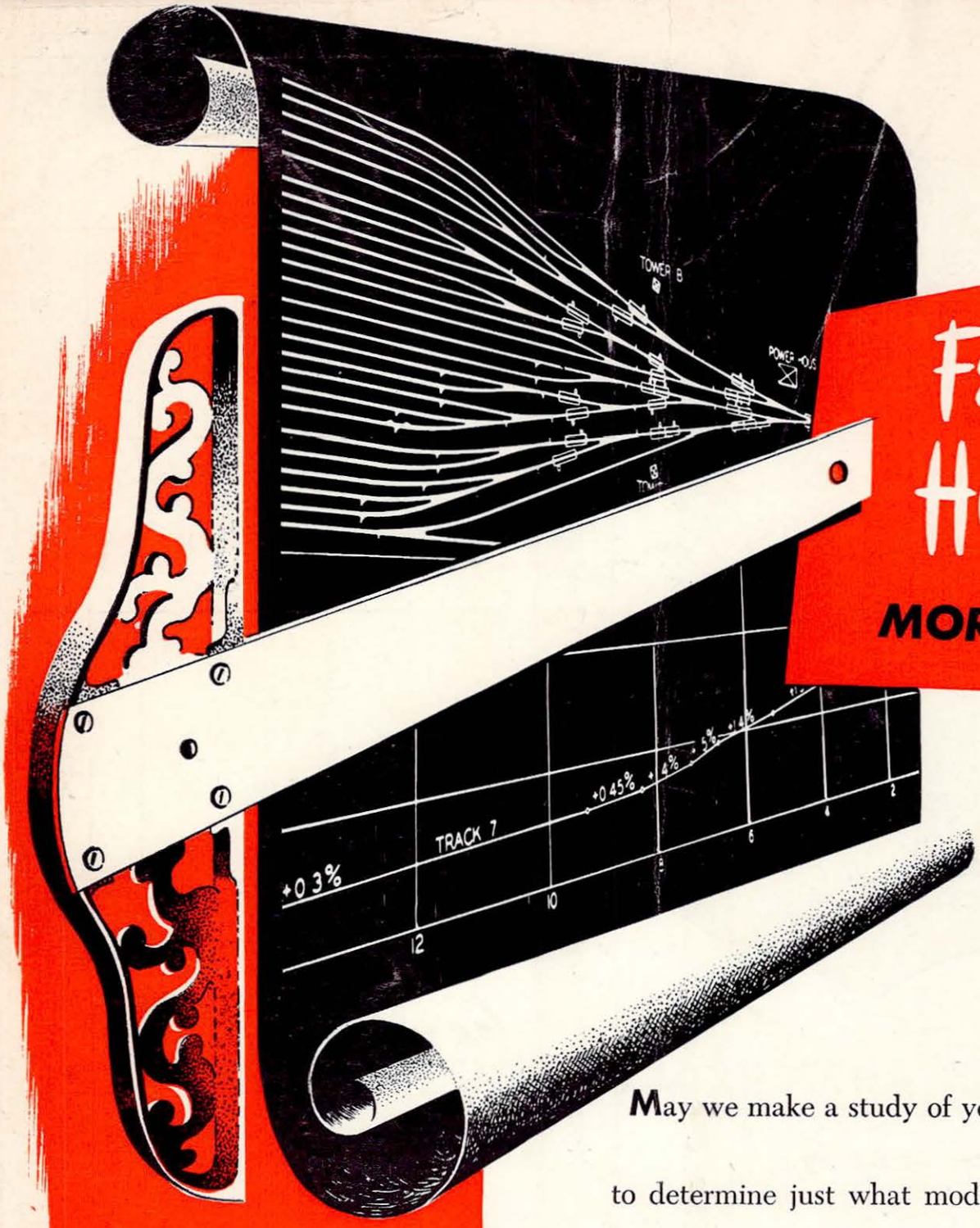

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